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# THE FASTING TREATMENT OF DIABETES.*

BY E. I. SPRIGGS, M.D., F.R.C.P.,
DUFF HOUSE, BANFF, SCOTLAND.

I PROPOSE to give a brief account of our experience with the fasting method at Duff House. The treatment has not been in use long enough to justify anything like a statistical analysis. I shall therefore pick out those cases which are most instructive, both as regards the results obtained and the difficulties met with.

Fasting has been used in diabetes as a means of reducing the sugar in the urine ever since it was proposed by Naunyn. It has usually, however, been prescribed with much caution, in earlier days because it seemed unlikely that it would do good to deprive the subject of a wasting disease of food, and in later days with the idea, shown to be mistaken by various workers, that because abstinence from food causes a moderate acidosis in health, it would aggravate the more severe acidosis of diabetes. But in mild types, and especially in the obese, fasting has long been found useful. I may here relate one such case, which was under treatment before Dr. Allen's work was known to me.

CASE I.—*Mild Glycosuria accompanying Hypoacidity, Ileal Stasis, and Obesity.* (Case 277.)

The patient, a stout man of 41, sought relief for abdominal pain and distension of three years' standing, with nausea and giddiness for the last year. He was under treatment for ten weeks. On examination the gastric juice was very poor in both acid and pepsin, the ileum, caecum, and appendix were adherent, and there was marked ileal stasis. The blood pressure was 175 mm. Hg.

The urine was found to contain 6 to 12 grams a day of sugar, but no aceto-acetic acid or acetone. The blood contained 0.17 per cent. of sugar. On a diabetic diet, continued for six days, the sugar varied from 5 to 2 grams; aceto-acetic acid and acetone appeared in the urine. Such a diet was undesirable from the point of view of the gastro-intestinal symptoms, and was not well borne.

He was therefore advised to fast, with the object of getting rid of the sugar more quickly. After one day sugar was absent. For the next six days he took a diabetic diet of 1,600 calories. He was then tested with the following foods in turn—bread, potato, oatmeal, milk, pear, apple, banana, grapes, orange, and puddings made with flour, 40 grams a day of carbohydrate being given in each case. The urine remained free from sugar, but there was still aceto-acetic acid and acetone, though never enough to estimate. The diet was increased until he was taking 112 grams of carbohydrate a day, of which 46 was in bread, 46 in puddings, 15 in stewed fruit, and 5 in milk. With this the acid bodies disappeared from the urine, which remained sugar-free.

After reading Dr. Allen's writings and becoming convinced that not only glycosuria but also acidosis was benefited by longer periods of fasting we began to make trial of the method.

### *Outline of the Procedure.*

Fasting is continued in bed until the urine has been sugar-free for twenty-four hours, unless there is some definite contraindication, such as nausea, vomiting, insomnia, or faintness. For the first two days of the fast nothing is given except a cup of tea with 10 c.cm. of 20 per cent. cream at breakfast and tea-time. After the first two days 150 c.cm. of clear meat broth is added at lunch and dinner-time. If acidosis is present after two days of fasting, alcohol may be allowed, 0.12 gram per kilogram of body weight being given in the form of whisky four times a day—at 11 a.m., 2 p.m., 5 p.m., and 8 p.m. In the cases described below no alcohol was used. When the urine has been sugar-free for twenty-four hours, 7.5 grams of carbohydrate is added in the form of vegetables which contain low percentages of carbohydrate. On the second day of feeding 30 c.cm. of cream is allowed with each cup of tea, and three eggs are added. On the third day of feeding, and on each alternate day subsequently, 5 grams of carbohydrate is added. Vegetables containing higher and higher percentages of carbohydrate are used, and finally porridge, oatcake, macaroni, bread, and fruit. The addition of carbohydrate is continued until sugar reappears or the tolerance reaches 3 grams of carbohydrate per kilogram. At the same time 15 grams of protein in the form of meat and fish are added daily up to 1 gram per kilogram or, in certain cases, more. When the protein has reached the desired amount, fat is added at the rate of 25 grams daily until the patient stops losing weight, or is getting 40 calories per kilogram. If sugar at any time recurs in the urine, the patient is fasted again until the urine is sugar-free for twenty-four hours. The diet is then resumed at the point where it was left off, but only half the amount of carbohydrate is given until the urine has been sugar-free for two weeks, after which the carbohydrate is increased at the rate of 5 grams per week.

The fasting part of the method is simple enough. The gradual increase of the food afterwards is not so easy, at all events in the more severe cases. Accurate diet lists and close daily supervision are required. We found that the figures given by Dr. Joslin for the carbohydrate content of the foodstuffs did not agree with those obtained in our laboratories for foods as served at table. No doubt the methods of preparation differ in different countries. My colleague, Dr. Pickering, constructed graduated tables of diet, therefore, based mainly upon the analyses of our own cooked foods, and these tables we hope to publish, as I believe they would be of use to the profession.

I will now describe five of the cases we have treated by this method, selected as representing different ages and varying degrees of severity.

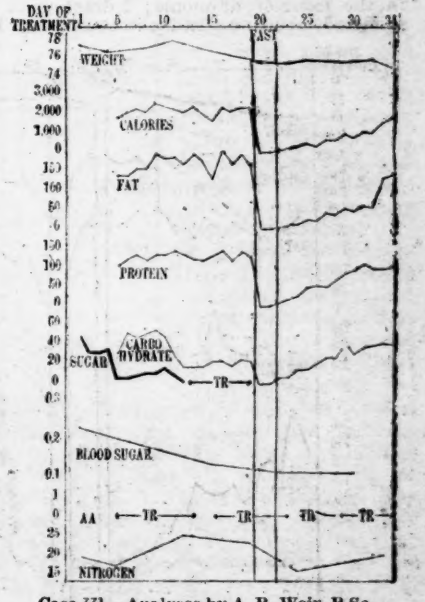
In all the sugar in the urine was estimated gravimetrically, and that in the blood by Bang's method as described by S. W. Cole. With Bang's method the normal blood sugar is about 0.11 to 0.14 per cent. For beta-oxybutyric acid Kennaway's method was used, and for aceto-acetic acid and acetone the Scott-Wilson method. In some cases Hurtley's method was used for aceto-acetic acid alone. Ammonia was determined by Malfatti's method.

CASE II.—*Mild Diabetes.* (Case 331.)

The patient, a man of 67, who had done much hard and responsible work in different parts of the globe, had not felt so well for the last eight years. Loss of flesh and polyuria was noticed six months, and glycosuria three months ago. He was under treatment for six and a half weeks. On admission he complained of feeling dizzy and squeamish, and of pains and stiffness in the thighs. The arteries were moderately thickened, the blood pressure 130 mm. Hg. Moist râles were heard at the base of each lung.

The urine contained 49 grams of sugar and a trace of aceto-acetic acid. The blood contained 0.24 per cent. of sugar. On a diet containing 64 grams of carbohydrate the sugar sank to 10 grams. With a further reduction of carbohydrate to 25 grams less than a gram of sugar persisted in the urine, and the blood sugar was now reduced to 0.14 per cent., that is, to within normal limits.

On fasting the urine became free from sugar at once. Feeding was begun after two days, the amount of carbohydrate, protein, and fat being gradually increased until a total of 3,304 calories, containing 88 grams of carbohydrate, 123 grams of protein, and 261 grams of fat, was taken. The urine remained sugar-free throughout except that a trace appeared when the carbohydrate exceeded the above quantity. Aceto-acetic acid and acetone were absent and the blood sugar remained normal. All the symptoms were gone except the stiffness of the thighs, which with suitable massage improved greatly. The weight fell nearly 3½ lb.




Case 331.—Analyses by A. B. Weir, B.Sc.

In all charts: TR, Trace; AA, aceto-acetic acid and acetone; O, beta-oxybutyric acid; NH, percentage of total nitrogen as ammonia; $NH_3$ ammonia in grams. The thickest line is the sugar, when present. The curve of the carbohydrate in the food, which sometimes crosses that of the sugar, is a thinner line.

This patient would probably have done well without



* A contribution to the discussion at the Royal Society of Medicine on May 16th, 1916, opened by Dr. O. F. F. Leyton.

fasting, according to earlier standards, but whereas, formerly, if sugar appeared in the urine he would have had to remain on a strict diet for a considerable time, he will now fast a day, and will then be able very soon to take again a diet containing a fair quantity of carbohydrate. In other words, he will be able to keep sugar-free with greater precision and comfort.

CASE III.—*Mild Diabetes in an Aged Man with Hypertrophied Heart and High Blood Pressure.* (Case 289.)

The patient was 79 years old. He had lived a vigorous open-air life, but had not restricted himself in any way as regards alcohol and tobacco. Thirst came on rapidly thirteen years ago, followed soon by achings and cramps in the limbs, which have persisted. He was under treatment for six and a half weeks.

He was stout, with thick arteries and an enlarged heart. The blood pressure varied from 184 to 225 mm. Hg.

The urine contained albumin varying from 0.5 to 1.5 parts per 1,000. There were traces only of aceto acetic acid and acetone. The sugar ranged from 20 to 40 grams; in ten days, on a strict diet, it sank to 8 grams.

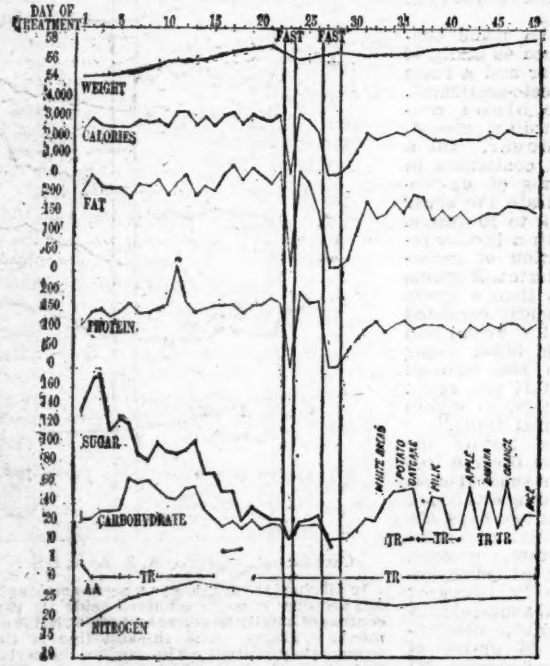
We hesitated at first to deprive this patient of food on account of his age, and, as a tentative measure, kept him in bed one day, and allowed him two eggs only. On this day the sugar fell to 2 grams. The next three days he took a strict diet, and passed 3 to 6 grams a day. He then fasted two days, on the first of which there was a trace of sugar, on the second none. He was now very hungry, and we gave him a diet of 1,600 calories—that is, more food than the routine prescribes—with the result that a trace of sugar was present on three of the next five days, and on the other two an estimable quantity.

He therefore fasted two more days, becoming sugar-free again, and remaining so while the diet was gradually increased to 1,800 calories, including 64 grams of carbohydrate, 40 of which was in the form of white bread. A trace of sugar then appeared, but after that the urine became sugar-free without further fasting, and remained so during tests with bread, potato, oatmeal, and milk. The albumin diminished, and for the last week of his stay was below five parts per 1,000.

CASE IV.—*Diabetes in a Young Man.* (Case 301.)

The patient, aged 25, was wounded by shrapnel on active service five months before admission. During convalescence a dry mouth and thirst came on rapidly and the urine was found to contain 10 per cent. of sugar. Weakness and aching of the legs followed. He was rather thin with a clear skin.

The urine contained 174 grams of sugar, 0.8 of aceto-acetic acid, and 0.1 of acetone; 6 per cent. of the total nitrogen was in the form of ammonia; 2 drachms of sodium bicarbonate rendered the urine alkaline in twenty-four hours.




Case 301.—Analyses by A. B. Weir, B.Sc.

With gradual restriction of carbohydrate the sugar sank in three weeks to 20 grams a day, the aceto-acetic acid increasing a little—namely, to 1.6 grams.

A fast of one day did not clear the urine, and after an interval he fasted three days, the urine becoming sugar-free on the second. The diet was then gradually increased, and the tolerance tested for measured quantities of bread, potato, oatmeal, rice, apple, banana. From these 98 to 100 per cent. of the carbohydrate was assimilated, the largest amount of carbohydrate taken in one day being 71 grams. On several occasions, when the amount of carbohydrate given touched the limit of tolerance, a little sugar appeared in the urine, but was always abolished by reducing the amount in the food.

The patient went away sugar-free, the symptoms having vanished and the weight increased by 10¾ lb. He and his medical adviser were provided with a scheme of diet based on the analytical results obtained.

The three preceding cases (II, III, and IV) are examples of different types. They include patients of ages ranging from 25 to 79. They show that fasting for three days, and underfeeding for several days after, did not give rise to any harmful or distressing symptoms, and led to much improvement in the feeling and condition of the patients. The urine became free from sugar and acid bodies without delay, and remained so on a more liberal diet than that taken before treatment.

I may add that repeated fasts have been used, under my direction, in diabetes complicated by phthisis, with excellent results.

In the two following cases, more severe in type, the treatment, though well borne by the patients, did not give such good results.

CASE V.—*Moderately Severe Diabetes.* (Case 337.)

The patient, aged 33, had lived in India for several years. While on active service in the Mesopotamian campaign, thirst, polyuria, and blurred vision came on suddenly, and the weight soon fell away. On examination, three months later, he was moderately thin, the pulse 112; blood pressure 164 mm. Hg.

On a diet similar to that taken before admission, which included about 80 grams of carbohydrate, the urine contained 83 grams of sugar, 2.2 of beta-oxybutyric acid and 0.6 of aceto-acetic acid and acetone; 5 per cent. of the urinary nitrogen was in the form of ammonia. The blood contained 0.19 per cent. of sugar. With reduction of carbohydrate to 30 grams a day (in greens and milk), the protein in the food being kept constant, the blood sugar fell to 0.14 per cent., and that in the urine to 14 grams a day, with 1 gram of oxybutyric acid and 0.5 gram of aceto-acetic acid and acetone.

He then fasted two days. There was a trace of sugar on the first day, none on the second. The blood sugar sank to 0.10 per cent. The diet was gradually raised in nine days to 2,000 calories, including 70 grams carbohydrate, without glycosuria. The acid bodies almost disappeared also, the total of the three being only 0.2 gram.

On giving more food, however, sugar appeared. A day's fast got rid of it, but it was not found possible this time to increase the food to the same extent as before, for sugar appeared and rose steadily even when no carbohydrate was taken except that in greens. Thinking that we might be giving some unsuitable form of protein we gave all the protein one day as fish and another as eggs, but the sugar continued to rise.

Ten days after the last fast the patient fasted again, this time for three days, the urine being sugar-free for the last two of them. The blood sugar was 0.12 per cent. Food was gradually added until, nineteen days after the last fasting day, a trace of sugar was found. At this time 2,200 calories, with 33 grams carbohydrate, was being taken. The blood sugar was 0.13 per cent.—that is, within normal limits.

The urine was again cleared by a two days' fast, the blood sugar falling to 0.10 per cent. The weight had now fallen 10 lb. in eight weeks, and the patient was desirous that we should spare him the long period of undernutrition and increase the food more quickly. He was then treated on former lines—that is, on a diabetic diet of sufficient heat value. The weight rose 11 lb., and the patient's sense of wellbeing and his energy rose with it, but sugar was present.

The chart (p. 843) shows well how glycosuria was postponed by making the addition of food very gradual. After the third fast it is seen that the increase of all the foodstuffs was much slower, but in each period of increasing food an estimable quantity of sugar occurred when the heat value reached the neighbourhood of 3,000 calories, which was 48 calories per kilogram. With 2,000 calories, giving 32 calories per kilogram, glycosuria was absent. The caloric value of the food—that is, the amount of protein and fat—appeared to have more effect in causing glycosuria than the amount of carbohydrate.

With the reduction in carbohydrate before the fasting the blood sugar fell to within normal limits, and the subsequent appearances of sugar in the urine were not accompanied by any obvious increase of that in the blood. But with the rise of urinary sugar at the end of the chart the blood sugar also rose. Foster suggests that glycosuria may be more difficult to control in patients without marked hyperglycaemia.

As regards acidosis, the graph shows that the first fast temporarily increased the oxybutyric acid, aceto-acetic acid, acetone, and ammonia, but this effect was less with each succeeding fast.

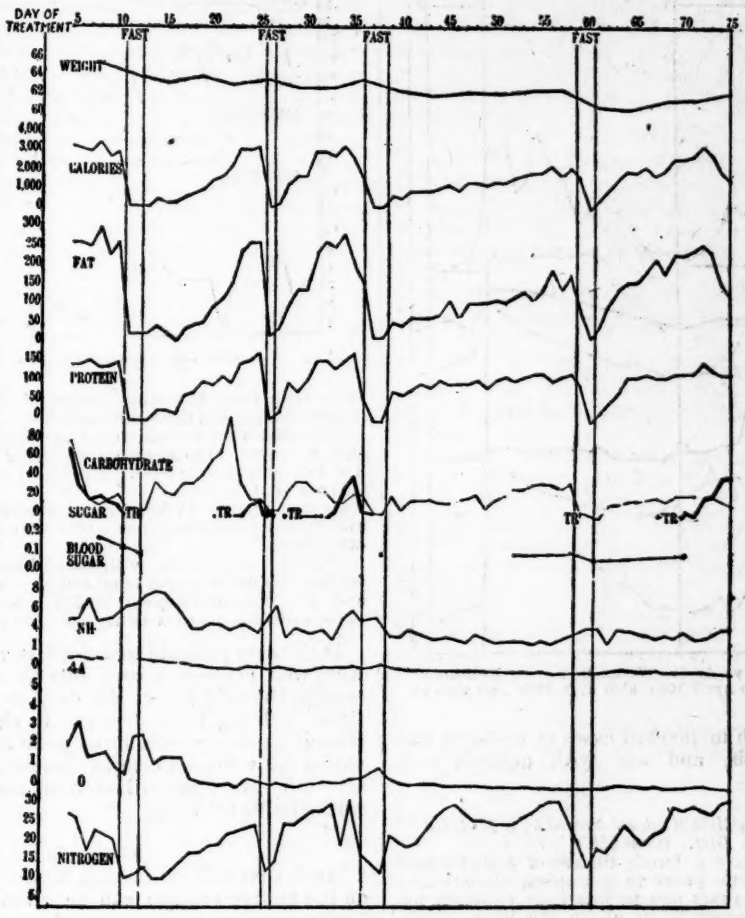
The fall of oxybutyric acid as carbohydrate food increased after the first fast is well shown, the amount dropping nearly to zero in about ten days.

On reviewing the treatment it is possible that this patient would have done better if after the first fast a weekly fast of a single day had been given to re-establish tolerance for food, or if less fat had been given. As regards the tolerance for carbohydrate, that appeared to be lower after the later fasts than at the beginning. It got worse and not better.

It is premature to draw any conclusions adverse to the treatment from this case, for in some respects Dr. Allen's instructions were not rigorously followed. I have related the case in some detail because it was carefully observed, and because it illustrates the advantage, the difficulty, and the disadvantage of the method in a moderately acute and resistant case of diabetes.

The advantage is immediate and obvious. The urine is cleared of sugar to the satisfaction of the physician and the patient. The difficulty lies in keeping the increase of protein and carbohydrate and fat a gradual one, and at the same time resisting the natural desire of the patient to get enough to eat. The disadvantage in this case was that when the patient was on a maximum diet of, say, 2,200 calories, his capacity for work and ordinary life was greatly diminished. He did not feel fit enough to drive his car even short distances for pleasure. On a fuller strict diet, although passing some sugar, he can drive, and works a couple of hours at a book he is writing with ease and enjoyment.

Experience may show that a man lives longer if he is kept sugar-free even at the expense of his general nutrition. But, until we have evidence on that point, I am inclined to think that in treating a chronic disease it is of importance to maintain the patient in such a state of nutrition that he can work and can enjoy himself.




Case 337.—Analyses by A. B. Weir, B.Sc.

Case VI.—*Severe Diabetes.* (Case 338.)

The patient, aged 24, was on active service in France when he caught a bad cold, followed by bronchopneumonia, and was invalided home. After a month he was better, but felt run down, and on examination the urine was found to contain 9 per cent. of sugar. Before coming to us he had been kept for a time on a strict diet, and then fasted four days. The urine had become sugar-free and the diet had been gradually enlarged.

On admission he was drowsy and the breath smelt strongly of acetone. On a strict diet of 3,000 calories the urine contained 176 grams of sugar, 9 of aceto-acetic acid and acetone, and 38 grams of nitrogen. The blood contained 0.21 per cent. of sugar.

The patient's condition appeared serious, and sodium bicarbonate was given in milk up to 35 grams (1¼ oz.) a day; this made the urine alkaline. A week after admission the temperature rose, and signs of bronchopneumonia developed. The acidosis became still more severe, aceto-acetic acid and acetone reaching 20 grams in the day. The urine became acid again, but was made alkaline by increasing the bicarbonate to 42 grams (1½ oz.) a day. The pneumonic signs disappeared, and in a little over two weeks after admission he was feeling well; the aceto-acetic acid and acetone had fallen to 5 grams a day. He was still taking 35 to 42 grams of sodium bicarbonate daily. The blood sugar was now 0.17 per cent.

A week later a fast was begun. It was not complete in that for the first five days 16 oz. a day of milk was drunk, as the bicarbonate was given in milk. The fast was continued for ten days, for the last five days of which no milk was taken, but at the end of that time the urine was not free from sugar. The chart (p. 844) shows the gradual fall from 137 to 14 grams a day. The blood sugar came down to 0.14 per cent.—that is, to within normal limits.

The diacetic acid and acetone were reduced from 15 grams to 3 grams a day. Corresponding with this the bicarbonate was cut down to 7 grams (¼ oz.) a day, the urine remaining alkaline. The acidosis was so much lessened that at the end of the fast no bicarbonate was needed for a fortnight, and then only half the quantity which had been needed before.

During the latter days of the fast the patient was extremely hungry and dreamed of food, but felt nevertheless better and clearer than he had for a long time. On gradually increasing the food to normal—that is, 40 calories per kilogram, without any carbohydrate except that in greens, the blood sugar rose again to 0.21 per cent.; the glycosuria also increased, though not to its former level. The acid bodies were in much smaller quantity than they had previously been on a strict diet. The patient was up. He felt weak but was cheerful.

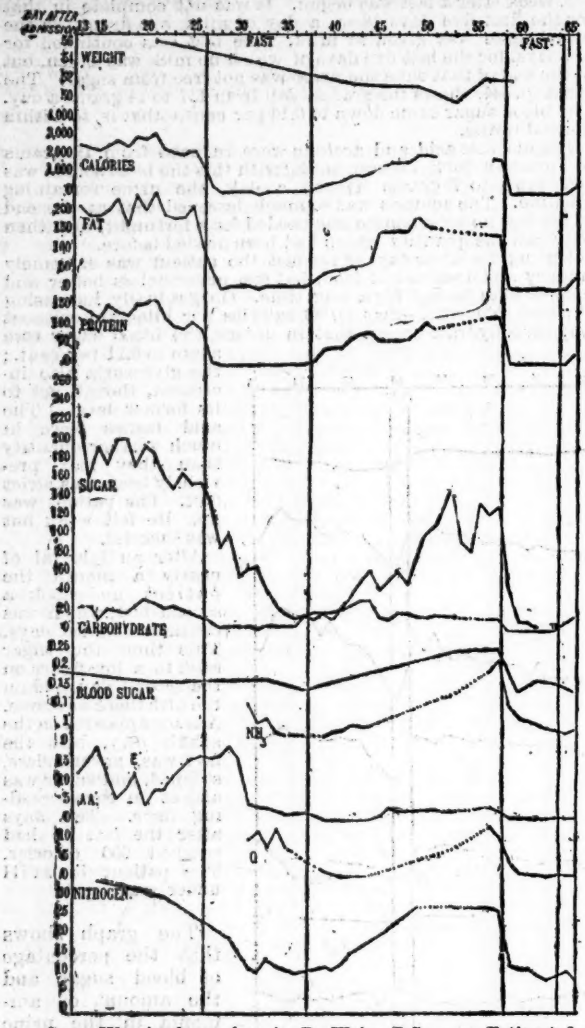
After an interval of nearly a month the patient undertook a second fast, which was continued for six days. This time the sugar sank to a low figure on the second day, and on the fifth there was none. A trace appeared on the sixth day, but the fast was, nevertheless, stopped, and sugar was absent on the succeeding days. Ten days after the fast he had reached 900 calories. The patient is still under treatment.

The graph shows that the percentage of blood sugar and the amount of ammonia in the urine both became normal. The oxybutyric acid, acet acetic acid, and acetone were also reduced rapidly to very small quantities.

I must not discuss the metabolic changes in detail to-day, but may point out that this patient was not only unable to use carbohydrate in the food but was excreting a large quantity of sugar formed from his tissues and from the protein, and perhaps the fat in the food. Fasting had the effect of enabling him for the time being to burn all, or nearly all, of the sugar produced from his tissues. Further, as less sugar was passed out after he was fed, it had improved his capacity for burning sugar made out of protein or fat in the food, and greatly reduced his acidosis. How far the benefit will reach remains to be seen. It is certain, however, that in a case of this severity such a good effect on the disordered metabolism cannot be attained by any other means at our disposal at the present time.

It is clear, therefore, that a fast offers the quickest means of restoring, to a greater or less degree, the power of assimilating the sugar which is made in the body from the protein, and possibly the fat, of the tissues or the food. It must not be forgotten, however, that the power to use sugar made in the body may be restored in all but the most severe cases, though much more slowly, by a strict adherence to a diabetic diet. This point is of such great

importance, especially to those who have to go on working, that I will venture to take up your time further by giving




Case 338.—Analyses by A. B. Weir, B.Sc. E, Estimated separately March 24th to April 10th, also 17th–19th and 25th to May 2nd.

two examples of it, both in marked cases of diabetes, one with but little acidosis, and one with acidosis well established.

CASE VII.—*Diabetes with Mild Acidosis treated by a Modified Strict Diet.* (Case 134.)

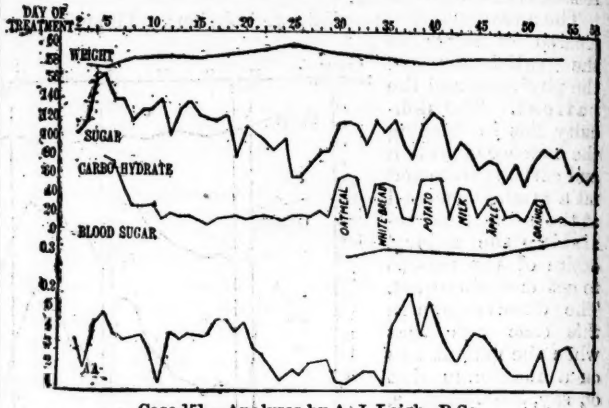
The patient, aged 44, gave a family history of diabetes and phthisis. He worked several years in a tropical climate and had had dysentery. Nine years ago he was near to death for some weeks with an abscess in or above the liver, either dysenteric or secondary to a gangrenous appendix. After a slow recovery he remained in this country. For the past two or three years he has done hard and responsible work. Two months before admission thirst and polyuria came on suddenly and glycosuria was found.

On admission the urine contained 137 grams of sugar, 0.3 of aceto-acetic acid and a little acetone. The blood contained 0.26 per cent. of sugar. In the course of three weeks the carbohydrate in the food was diminished, and after that a strict diet was taken for a week. By cutting off carbohydrate gradually an increase of the acidosis was successfully avoided. A few grams of sugar, however, still persisted in the urine. Tests were then made to find out what carbohydrates were assimilated best; these showed very poor assimilative power except for apples. He went away at the end of two months, with about 5 grams of sugar per day in the urine. The symptoms had disappeared. There was great gain of vigour and an increase of weight of 5½ lb. The blood sugar on departure was 0.22 per cent. He was advised to keep to a strict diet, with an apple three times a week and two vegetable days a week. He did this conscientiously, with the result that the urine became sugar-free two months later and remained so.

A year after his first admission he returned to be "chemically overhauled." In the interval he had been working continuously. The urine was free from sugar. Aceto-acetic acid and acetone were present, but not enough to estimate. The blood sugar had become normal, 0.11 per cent. On adding small quantities of starches no sugar appeared, and in the course of three weeks the carbohydrate was increased until a diet containing 81 grams carbohydrate, 96 of protein and 180 of fat was taken, yielding 2,400 calories. On this there was no sugar or acetone, and only a trace of aceto-acetic acid.

CASE VIII.—*Diabetes with Marked Acidosis treated by a Modified Strict Diet.* (Case 151.)

A man of 57 had had cramps in the legs for eighteen months, had lost over a stone, and felt ill. Polyuria was noticed and sugar discovered. On admission the blood pressure was 180, the liver enlarged. The urine contained 172 grams of sugar, 5 grams of aceto-acetic acid, and 0.2 gram of acetone. The blood contained 0.37 per cent. of sugar. The patient bore restriction of carbohydrate badly at first, but became accustomed to it later. The sugar did not fall, however, below 60 to 100 grams a day after three weeks on a strict diet. The aceto-acetic acid, though rising at first, settled to a level of about 2 grams a day. Tests with various carbohydrates showed that 76 per cent. of the sugar in milk was assimilated, rather less from apples, and




Case 151.—Analyses by A. J. Leigh, B.Sc.

very little from the other forms of starch and sugar tried. After two months the symptoms were almost gone, the general health much improved, and the weight heavier. There was still, however, 50 to 80 grams of sugar a day in the urine and 2 to 3 of aceto-acetic acid. The blood sugar varied from 0.30 to 0.35 per cent.

He was advised to keep three absolutely strict days a week and to take an allowance of a pint of milk and an apple on the other days.

After a year's work with careful adherence to the diet prescribed the urine is free from sugar, diacetic acid, and acetone, and the patient in good health. Small quantities of other carbohydrates are now being added to the diet.

Both these patients took food of adequate caloric value, were well nourished, and able to work steadily and efficiently, the evidence of the disease becoming less all the time. I bring them forward to show that cases which were in some respects intractable in a two months' observation did well as a result of keeping steadily to their diet, after an investigation had been made to find what food was suitable for them.

## CONCLUSIONS.

Much time will be needed before a reasoned judgement on the fasting method can be given. At the present time I may summarize our observations as follows:

Fasting, up to several days, was well borne by cases of mild and severe diabetes of ages ranging from 24 to 79.

The urine was made free from sugar, the blood sugar was reduced, and acidosis greatly diminished.

All the patients felt better for the fast.

In most cases the food could be increased gradually, without glycosuria, until a more liberal diet was being taken than before treatment.

The rapid abolition of sugar had an excellent mental effect. It shortened tedious treatment, and enabled more time to be given to finding out what food should be taken and in what quantity.

The gradual increase of food after the fast calls for skilled dietetic arrangements and careful daily attention. It is not so easy as an ordinary strict diabetic diet. It is useless, however, except in the mildest cases, to increase the food quickly after the fast, as sugar returns at once.

During the gradual increase of food the patient is undernourished. In severe cases courage and endurance are called for on his part, as it may be necessary to keep him so short of food that he is inefficient.

Regular estimation of the blood sugar should be made.

In some cases of diabetes as good an effect may be

attained, though much more slowly, without fasting and subnutrition, with its risk of depression and weakness, provided the patient is willing to keep permanently to the diet which has been found by careful testing to be suitable to his case.

At the present time the doctor, in order to decide as to the best treatment in severe cases, must judge of the temperament of the patient. To some it is purgatory to be continually having to think about tests and figures. These will do best with definite allowances in an otherwise rigid diet. In others the disadvantages of a half-starved condition must be balanced against the mental effect of the absence of sugar. We do not yet know whether the progress of the disease is arrested by this method in cases in which it would not be arrested by a permanent adherence to a rigid, though plentiful, diet.

For all milder cases, indeed for the majority of all cases, Dr. Allen's procedure offers great advantages. We have evidence enough that such patients, though not cured, may be freed from the signs and symptoms of their complaint. This beneficent result has been attained through the extraordinarily wide and painstaking researches of Dr. Allen on animals. None but those whose lot it has been to attempt to make researches and to describe them when made, can appreciate the perseverance and the labour which have gone to the making of Dr. Allen's book and subsequent writings. I am sure we rejoice with him that he has been the means of enabling a clear step forward to be made in the treatment of a distressing complaint.

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# A SIMPLE SYSTEM OF SKELETON SPLINTING.

BY C. MAX PAGE, M.S., F.R.C.S.,
CAPTAIN R.A.M.C.(S.R.).

THE value of skeleton splinting in the treatment of gunshot fractures has been generally recognized during the present war. Lieutenant-Colonel Robert Jones[1] was responsible for the introduction of this type of splint, and for the extension of its use in our army medical service. I have previously described[2] how the aluminium stapled strips contained in the field fracture box may be used to make splints of this kind. These stapled strips, however, having been designed to form imitations of the classical solid splints, do not afford an ideal method of coupling lengths for the formation of skeleton frames. The joints effected by the method are not mechanically sound, and hinge formation is not possible. I propose here to describe a system of coupling which has not these defects, and, moreover, one in which the process can be easily and rapidly carried out.

## MATERIAL AVAILABLE.

Aluminium strips, $\frac{1}{2}$ in. by $\frac{3}{16}$ in., form splints which are easily malleable by hand, and are sufficiently stable for field purposes. In the case of the larger splints for the lower extremity, however, the material is not always sufficiently rigid for prolonged treatment. Further, at the present time the supply of aluminium for surgical purposes is limited.

There are similar objections to the use of copper and zinc alloys; annealed mild steel appears to be the most satisfactory material available. Annealed steel, $\frac{1}{2}$ in. by $\frac{1}{8}$ in., has much greater vertical rigidity than aluminium, and though it has more lateral spring, it is sufficiently malleable for practical use.

I will therefore describe the system of coupling in relation to the use of annealed mild steel.

### *Specification of Material.*

The stock material consists of five-foot lengths of annealed mild steel $\frac{1}{2}$ in. by $\frac{1}{8}$ in. This material is of standard type, and is sold by any iron merchant. The strips are drilled throughout their length at 1 in. intervals with holes of $\frac{1}{8}$ in. diameter. The holes must be accurately distanced throughout the strips.

Split steel rivets $\frac{5}{8}$ in. by $\frac{1}{8}$ in. are required to couple the various lengths after they have been bent to form the splint required.

### *Tools Required.*

*A cramp* of the new pattern supplied in the field fracture box; this serves to hold the strips while they are being bent in the direction of their vertical section.

*A screw wrench* with slots $\frac{1}{8}$ in. by $\frac{1}{8}$ in. cut in the jaws $\frac{1}{8}$ in. from the shaft (Fig. 1). This wrench holds the strips and supplies the leverage for bending them; it also serves as a hammer.

*A hacksaw* for cutting the material.

*A triangular file* for trimming the ends or for cutting the strips if the saw be not available.

*A pair of "bell" pliers* with a screwdriver end on one handle; the latter is used to spread the rivets, and the pliers to crush them after they are in place (Fig. 2).

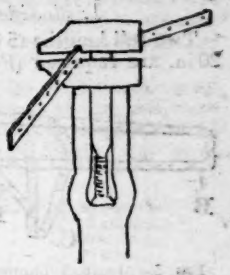


FIG. 1.—Screw wrench with $\frac{1}{8}$ in. by $\frac{1}{8}$ in. slots cut in jaws, holding a strip of splinting.

### *Method of Cutting Strips.*

To divide the mild steel strips at the required level the material is cut half through with a hacksaw, and then snapped off by hand. In using the hacksaw, the tool should only bear by its own weight lest the blade be broken.

The triangular file can be used for the same purpose, but is not as neat or quick to work with.

### *Method of Bending Strips.*

The strips can be moulded on the flat by hand; if a sharp angular bend is required, the screw wrench should be used.

To bend the material on edge, the strip is fitted into the cramp, the screw wrench is fitted home on the strip close to the cramp, and then used to lever the material to the desired angle (Fig. 1). A right angle is the sharpest bend which can be effected in this way, unless the material is previously heated, and even then there is a tendency for the strip to buckle; this tendency is overcome by removing the strip from the cramp in the course of the process and beating out the angle on an anvil. If the part of the strip to be bent is first heated in the flame of a Primus stove, the procedure is much facilitated.

### *Method of Coupling Strips.*

Strips are united in their long axis by passing split rivets through opposed holes. The rivets are then spread with the screwdriver end of the pliers and finally crushed or hammered out (Fig. 2). Three rivets give a firm longitudinal junction.

1. 2. 3.

FIG. 2.—Side view of two lengths of splinting, showing (1) rivet in place, (2) spread, (3) crushed down.

A hinge joint is formed by a single rivet.

A rigid joint at any angle is made by strutting such a hinge joint (see Fig. 3, D).

### *Completion of Splint for Application (Pads and Slings).*

The only part of these splints which requires formal padding is the crutch in those of the modified Thomas's pattern (shown in Fig. 3 at A, in Figs. 6 and 11, and in Fig. 12 at C). This is best effected by winding tow evenly on to the part of the frame which forms the crutch; the tow is then fixed by bandaging firmly over it. For treating compound fractures in the early stage, it is desirable to cover the pad so formed with impermeable material. I have found a length of bicycle inner tube the most satisfactory; this should be rolled on to the splint in the same way as a rubber cricket bat handle is put on; it is then fixed at either extremity with a strip of adhesive plaster.

In splints for the upper extremity the crutch may often be sufficiently padded by passing a length of stout drainage tube on to that part of the frame.

In general, the splints are completed with slings. These are best made from some adaptable but inextensible material, such as old linen. In certain cases troughs of

perforated zinc sheeting may be substituted for the fabric slings. No padding is ever needed between a linen sling and the skin.

### Type Splints for the Lower Extremity.

#### 1. *Modified Thomas's Knee Splint.*

Two full lengths (5 ft. each) of splinting and one of about 20 in. are required (Fig. 3). The crutch, A, which should

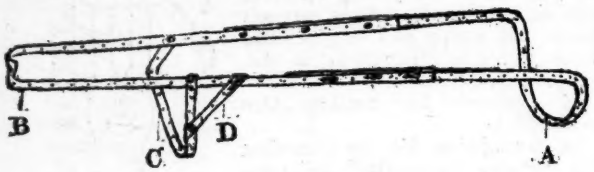



Fig. 3.—Modified Thomas's knee splint. A, Crutch; B, notch in stirrup extremity; C, prop; D, strut fixing prop.

measure about 15 in., is bent in the central part of one full-length strip. This involves two right angle bends on edge. The crutch should not form simply the section of a circle; it should be moulded as shown in Fig. 4. The stirrup extremity, B, is readily moulded by hand in the form shown in the figure from the remaining long strip. These two parts are then united by rivets to give a splint of the required length; for an average case there should be an overlap of 9 in. on the inner side and 7 in. on the outer (supposing the crutch to have been centrally placed); this gives the necessary obliquity to the crutch. Three rivets on each side give a firm junction. The prop, C, is then bent and attached to the splint by a rivet and strut, D, about 18 in. from its lower extremity; the base of the prop should measure at least 10 in. if the splint is to be used for transport.

Fig. 4.—Diagram of proper shape of a thigh crutch for the right side, seen from above.

An arch may be placed between the side limbs of this splint, about the level of the knee-joint if particular rigidity is required. A footpiece, as shown in Figs. 6 and 9, may be fitted when necessary. The splint may be flexed at the knee-joint in those cases in which straight extension does not produce good alignment of the fragments of the femur; under these circumstances it will be found necessary to bend the side members of each section separately before riveting them together.

This splint, completed with linen slings, is well suited for the treatment of many cases of fractured femur as well as injuries of the knee-joint and tibia. It should be slung in the ordinary way from four points (as shown in Fig. 7), the prop only coming into action during transport.

A strap passed across the front of the thigh keeps the crutch in place during movement; another one should be passed in front of the tibia just below the knee-joint; this should only be tightened when the patient is rolled on his side; it will be found that the flat surface of the side members of the splint adapts itself closely to the surface of the thigh, thus giving excellent lateral support to the limb in the circumstances.

The fixed extension obtained by means of this splint is effected by a canvas strap passed around the notch in the stirrup of the splint and the spreader.

#### 2. *Hodgen's Splint.*

This type (Fig. 5) is made in the same way as the previous pattern, except that an arch, C, is substituted for a

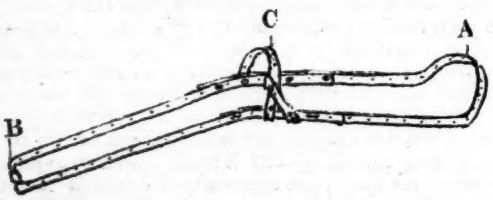



Fig. 5.—Hodgen's splint. A, Anterior thigh arch; B, stirrup notch; C, knee arch.

prop, and the side members are slightly flexed at the level of the knee-joint.

#### 3. *Skeleton Double Incline Splint.*

This splint (Fig. 6) is made from the same elements as the modified Thomas's knee splint. The side members of

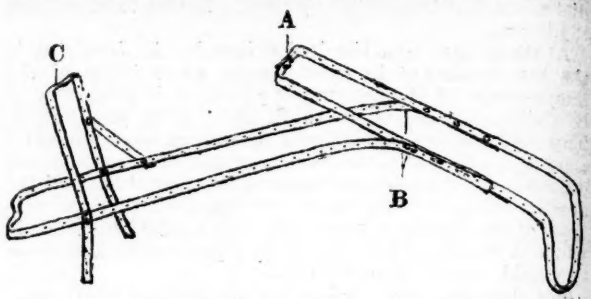



Fig. 6.—Skeleton double incline splint. A, Knee stirrup; B shows bend in lower side members of the splint; C, foot arch and props.

the crutch section are bent in and joined with two rivets to form a 4-in. stirrup, A. The side members of the stirrup section are bent to an angle of about 135 degrees at B, before being riveted to the upper part.

In the type illustrated in the figure (6) a combined footpiece and prop C is bent from a length of about 24 in., and is riveted and strutted in the required position. If no control of the foot is required, a simple prop may be substituted.

This splint has been designed for use in cases in which both the tibia and femur are broken. It allows extension to be applied independently to each bone. The splint is shown in use in Fig. 7.

The extension appliance for the femur may be of the adhesive variety, or when insufficient whole skin is avail-

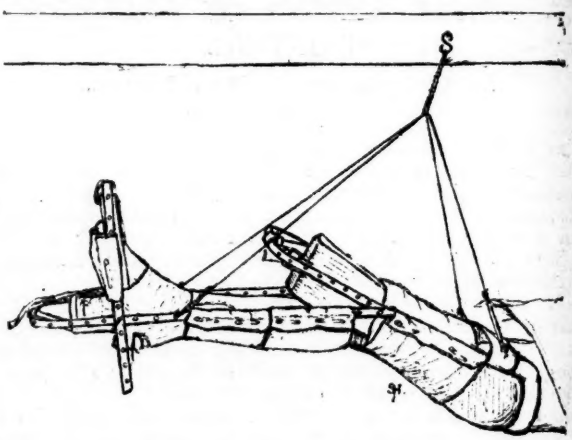


Fig. 7.—Skeleton double incline splint applied. The splint is suspended by four points from a beam. Linen slings support the limb, and fixed extension is applied separate y to thigh and leg. The crutch has been padded as described in the text.

able for the purpose a collar of plaster-of-Paris may be moulded on to the condyles of the femur. A strap of elastic extension is passed from the transverse A round the spreader of the extension appliance (Fig. 7).

In general the method of application of the splint is the same as for a Thomas's knee splint; the strap in front of the thigh to keep the crutch to its work is essential. In cases where the tibia and fibula are broken the footpiece comes into use. This may be completed with fabric slings of zinc sheeting; when necessary the foot may be suspended as shown in Fig. 8.

Fig. 8.—Diagram to show method of suspending the foot with an adhesive strap from the foot arch.

In some cases suspension by a single strip of fabric stuck to the sole of the foot with glue (Heusner's) may be an advantage; this is especially the case when there is paralytic foot-drop. The footpiece should then be set rather higher up on the splint than the level of the sole of the foot in order to give the necessary control of the tendency of the foot to become plantar flexed.

4. *Knee Splint (Jones).*

The backbone (Fig. 10) is made from two lengths of about 42 in. riveted together at a few points and bent to shape by hand. One thickness of the splinting is not sufficiently rigid. Thigh, calf, and foot pieces of suitable dimensions made from zinc sheeting are then riveted on to the backbone. The zinc sheeting can be reinforced, if necessary, by riveting stout cardboard, linoleum, or similar material on to it. To more closely copy the original pattern of the splint, the footpiece may be made from two short lengths of the splinting.

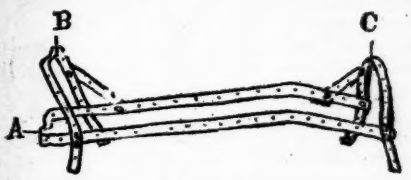



FIG. 9.—Tibia splint. A, Stirrup notch; B, foot arch hinged and strutted on to frame; C, thigh arch similarly attached.

5. *Tibia Splint.*

This (Fig. 9) is made from one full length of the splinting, and from two pieces of 24 in. and 20 in. respectively.

The main frame is bent from the full length with a notched stirrup A, and slight angles at the level of the knee-joint. The footpiece and prop B (24 in.) is made as for the double incline splint. The upper arch and props C are similarly riveted and strutted on. The splint is best completed by fabric slings.

For any case in which the fibula is intact no extension will be required. If both bones are broken and there is any tendency to overlap, fixed extension is effected as follows: A light collar of plaster-of-Paris is moulded round the leg at the level of the tubercle of the tibia; the side members of the splint are then fixed to this collar by another encircling plaster bandage, or else two side straps may be passed up from the collar and attached to the sides of the arch C. Counter fixation having been thus secured, traction is made through a strap passed around the notch in the stirrup at A and the spreader of the extension attachment.

FIG. 10.—Jones's knee splint. The backbone is made from two lengths of splinting lightly riveted together; thigh, calf, and foot pieces are made from perforated zinc sheeting.

6. *A Stump Tractor (after Makins).*

This (Fig. 11) is made in the same way as a modified Thomas's knee splint, but it will naturally be shorter.

An apparatus for thigh stumps is made from one full length of splinting; a prop of the type shown in the figure is added, it should be of such a height that while the hip-joint is not materially flexed the lower surface of the stump is kept clear of the bed.

Extension is made from an adhesive attachment to the skin through a circular or cross-shaped spreader. The adhesive should be applied to the greatest possible surface of skin.

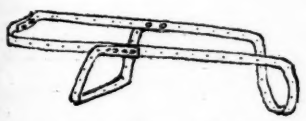


FIG. 11.—Stump tractor.

*Application of Extension Apparatus.*

There are certain practical considerations in relation to the general application and use of these splints which may be referred to here.

In cases of fractured femur, in the absence of wounds in the leg, a simple adhesive extension (Buck's) is the most satisfactory.

The apparatus consists of two side straps of 2-in. adhesive plaster continuous below over the spreader. The spreader should be slightly wider than the measurement between the outer surfaces of the two malleoli. The side straps are lined with lint in their lower six inches.

After shaving the limb, the side straps are applied; they should adhere to the upper two-thirds of the leg and to as much of the skin of the thigh as circumstances permit. The side straps are kept to their work by a carefully applied open wove bandage, extending from 3 in. above the level of the malleoli to the upper extremity of the plaster. Circumferential bands of adhesive plaster are never necessary, and their edges are always liable to cause pressure sores as the extension slips slightly in the course of treatment.

In the place of adhesive plaster strips of fine calico may be used, a soluble glue being employed as the adhesive medum. Heusner's glue is a satisfactory preparation of this kind, and is made of cheap ingredients; its composition is as follows:

| | |
|---|---|
| Resin ... ... ... ... ... ... ... | 50 grams. |
| Venice turpentine ... ... ... ... ... | 5 grams. |
| Methylated spirits ... ... ... ... ... | 50 c.cm. |
| Benzine ... ... ... ... ... ... ... | 25 c.cm. |

After the skin has been shaved the glue is painted on the required area and allowed to become "tacky"; the fabric is then pressed on to it and a bandage applied over the whole. No further application of the glue should be made. Extensions put on in this way hold very firmly for a few weeks; slight vesication sometimes occurs at the margins of the surfaces of application.

If multiple wounds prevent the use of an adhesive extension, the pull must be taken from a more limited area. In such circumstances plaster-of-Paris is the best medium. It can be applied as an anklet or knee-cap. An anklet is made by binding one or two muslin plaster bandages directly around the ankle and incorporating the tails of the extension in it. The skin is greased and if necessary shaved. The bandage should extend well down on the os calcis and forward on the instep to within an inch of the base of the toes. The anklet is moulded on to the prominent points about the ankle, and allowed to harden before any extension is applied.

The knee-cap takes its main purchase from the condyles of the femur, particularly the inner one. A plaster bandage is applied evenly to the knee-joint area, extending from one inch above the upper border of the patella to the level of the joint line. As it dries the plaster is laterally pressed and so moulded firmly on to and above the prominences of the two condyles of the femur; the grooves so formed should be held till the casing becomes firm.

These two procedures have the disadvantage that they fix the joints covered, but they allow very powerful extension to be made during the necessary period. In my experience most leather anklets if used under pressure cause sores in a few days, or even during the period of transport from clearing station to base.

*Control of the Foot.*

In many cases of fractured femur, when a limb has been put up on a Thomas's or similar splint, the patient is able to fully dorsiflex his foot voluntarily. If he is encouraged to do this regularly, no fixation of the foot need be practised.

In other cases, especially when there has been some injury to the external popliteal nerve, the position of foot-drop tends to become permanent. In these circumstances a foot arch should be attached to the splint as shown in Figs. 6 and 9, a bandage stretched tautly across the arch will then serve to keep the foot up. In some cases suspension from the heel with a strip of adhesive may be resorted to, as shown in Fig. 8. An alternative method is to apply a strip of fine calico to the surface of the sole of the foot with soluble glue, and to suspend from this.

Undue external rotation of the foot and leg in cases of fracture does not often occur in limbs which are put up properly extended.

The correct position of the foot is determined by comparison with the sound side, it being borne in mind that the foot rolls out naturally a little in the passive supine position.

*Avoidance of Pressure Sores.*

Pressure sores are, and should be, the great bugbears of the surgeon treating fractures of the lower extremity. In cases treated on splints of the above described types they may appear in the following situations:

(*a*) *Over the Area Exposed to the Pressure of the Crutch.*—Theoretically, a sore from crutch pressure should develop over the tuber ischii. Not infrequently,

however, the skin in the genito-crural area may be eroded, and sometimes that in the ischio-sacral angle. Such sores should not appear if the patient is rolled on his side daily and the skin under and around the crutch cleaned with spirit, gently massaged, and then powdered. If wound discharges gain access to the area, even more frequent attention is necessary. It should be remembered that pressure sores are most liable to occur in the first few days after the application of a splint before the skin has adapted itself to the new situation. Great care should therefore be taken in sending patients from a clearing station to the base to minimize any necessary pressure.

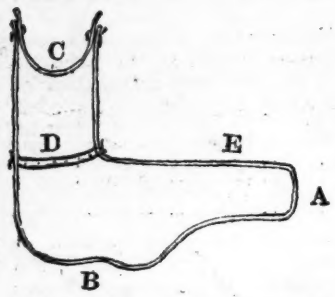



FIG. 12.—Bent arm splint. A, Hand arch which is used for a hand grip or for the attachment of an extension strap in cases of fracture of the forearm; B, notch for extension strap in cases of fractured humerus; C, axillary crutch hinged by single rivets on to main frame; D, reinforcing arch which may be omitted.

(*b*) *Over Lateral Prominences of the Limb.*—The side members of the splint may press on the limb at the knee or the ankle; such a possibility should be avoided by bending out the splint at the level implicated, and not by the insertion of a pad.

(*c*) *In Relation to Extension Attachments.*—Adhesive extensions applied as described above will not damage the skin; on the other hand, transverse bands of adhesive strapping at the level of the tubercle of the tibia and about the ankle are prolific sources of sores.

*Plaster-of-Paris appliances* gain a very positive hold of the limb, and if a very powerful extension is applied sores may result, but they are not frequent if the plaster casing is carefully moulded to the limb and allowed to harden properly before any pull is applied. Such extensions should be changed if the limb shrinks much in size from the subsidence of swelling or from muscle wasting.

## TYPE SPLINTS FOR UPPER EXTREMITY.

*Modified Straight Thomas's Arm Splint.*

This splint is a small replica of the lower extremity type (Fig. 3). It can be made from one full length of splinting and a piece of about 16 in. A small prop should be placed at about the elbow level.

FIG. 13.—Bent arm splint diagrammatically applied for a case of fractured humerus. The axillary crutch is padded by a length of drainage tubing. F, Extension strap for a case of fractured humerus.

*The Bent Arm Splint.*

This (Fig. 12) is made from one full length of splinting bent on the flat to the form shown in the figure, and from a 12 in. length. The 12 in. strip is bent in a half circle to form an axillary crutch, C; this is pivoted on to the two free extremities of the main frame. A 9 in. arch, D, may be placed at a convenient level in the elbow region in order to reinforce the splint as a whole. The crutch is padded with rubber tubing and internal slings applied to the frame to complete the splint for use.

For cases of fracture of the humerus when light extension may be required, the hand is fixed to a pad on the frame either at A or E. Extension is then made by a strap or a few turns of rubber bandage passing over the front of the forearm and around notch B. The splint is shown diagrammatically applied in Fig. 13. When the splint is used for fractures of the forearm, extension is obtained by fixing the upper arm to the posterior part of the frame and extending from A through an adhesive attachment to the wrist and hand. The pivoting of the crutch (C) allows of easy temporary or permanent abduction of the arm.

*Hinged Elbow Splint.*

The frame is made (Fig. 14) from two upper side pieces of about 7 in. length; the forearm and hand arch require a length of about 40 in. The single rivet hinge joint at the elbow is fixed at the required angle by one or two struts. The splint is completed with zinc troughs, as shown in figure.

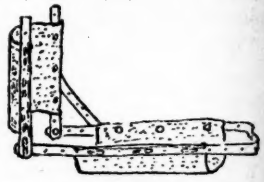


FIG. 14.—Hinged elbow splint strutted at a right angle.

*Jones's Elbow Splint.*

The backbone of this splint is made (Fig. 15) of two lengths of about 26 in., riveted together at a few points. Two troughs are added, as shown in the figure. This splint can be bent so as to be used as an anterior splint if necessary.

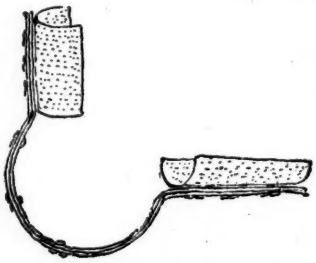


FIG. 15.—Jones's elbow splint.

*Wrist Splint.*

The forearm and hand frame (Fig. 16) is made for average cases from a length of 36 in. The upper arm arch and side pieces are bent from a length of about 12 in. The latter is hinged and strutted on to the main frame. If it is desired to put the hand up in extension the frame is bent at B, as shown.

Slings are arranged to hold the upper arm and forearm. The wrist can be held extended by a single narrow band across the palm, if it is desired to leave the fingers free.

FIG. 16.—Skeleton of forearm and wrist splint.

## CONCLUDING NOTES.

It should be understood that the measurements and details given for all the above described splints are for average cases. Modifications in size and design will often be necessary, and are readily carried out.

If aluminium strips be used on the same system the ease with which angular bends can be carried out on edge with this material will make many of the above described single rivet and strut joints unnecessary.

The splints can always be reinforced, if exceptional rigidity is required, by the addition of arches or by riveting extra lengths on to the main frame.

REFERENCES.

[1] Robert Jones: The Mechanical Treatment of Gunshot Fractures, BRITISH MEDICAL JOURNAL, 1915, i, 101. [2] Max Page: Aluminium Skeleton Splints, BRITISH MEDICAL JOURNAL, 1915, i, 839; and Notes on the Transport of Cases of Fractured Thigh, BRITISH MEDICAL JOURNAL, 1915, ii, 173.

MEDICAL inspection in Boston under the supervision of the School Board came into force on November 22nd, 1915. A report by Dr. W. H. Devine, Director of Medical Inspection, on the physical examination of children in the public schools from December 1st, 1915, to April 1st, 1916, states that 49,777 pupils were examined; of these, 34,792 were found to present defects. The conditions classed as "defects" included defective nasal breathing, hypertrophied tonsils, bad teeth, defective palate, cervical glands, pulmonary disease (24 tuberculous, 456 non-tuberculous), heart disease (organic 725, functional 888), nervous disease, chorea, joint and bone disease (tuberculous 49, non-tuberculous 877), skin disease, rickets, malnutrition, and mental deficiency (243). The number of cardiac cases, according to Dr. Devine, suggests that the prevention of heart disease offers a great field for research in prophylactic medicine.

## A "CAGE" SPLINT FOR FRACTURES OF THE HUMERUS.

BY CAPTAIN E. M. COWELL, R.A.M.C.(S.R.).

THE splints that experience has shown to be of value in the treatment of fractures of the humerus at a casualty clearing station are the following:

1. *Surgeon-General Sir Anthony Bowlby's splint*, shaped like the letter P lying on its side, and composed of a rubber-covered iron loop made to pass over the shoulder and attached to a wooden bar for the support of the forearm. This splint is useful for fractures of the upper part of the shaft, but is difficult to keep in position.

2. *Clarke's F-shaped splint* is made with a long horizontal bar supporting the forearm, and an additional piece of wood hinged on to the internal vertical part to give support posteriorly. This splint is extremely useful where there is great loss of tissue and the bone is severely comminuted. Irrigation can be readily performed, the wound can be easily inspected at frequent intervals without disturbing the patient, and where the onset of gas gangrene is expected the wounds, unless posterior, can be exposed to the air or sunlight if desired.

3. *Lieutenant-Colonel Robert Jones's Modified Thomas's Arm Splint.**—Neither the straight nor special bent form has been used owing to unsuitability for travelling.

4. *Captain Max Page's Aluminium Splint.** — This closely resembles Sir Anthony Bowlby's iron and wood splint, but is less rigid.

5. *Lieutenant-Colonel G. M. Giles's Metal Splint.*— This splint was recently described,[1] and presents one important feature also seen in the splint described below —namely, a firm metal loop passing over the acromion, fastened under the opposite axilla, and thus forming a fixed point from which extension is made. The splint, however, is made from materials not at hand in a clearing station, and takes "less than an hour" to manufacture.

### *The Cage Splint.*

Having tested the above-mentioned splints by a considerable experience, I have for several months past used a splint of my own device, which, in addition to the advantages of the several splints mentioned above, presents many of its own. It is very light, and supports the upper limb completely, allowing ready access to the wounds. In most cases the patient can be evacuated as a sitting case, and moves about without pain or discomfort. The splint can be put together in a few minutes by an intelligent orderly from the aluminium splinting, abundance of which is always available. It is useful for all fractures of the humerus, more especially for those of the lower two-thirds of the shaft, also for severe fractures of the elbow-joint and extensive wounds of the upper part of the forearm.

The details of construction of the splint can be readily seen by reference to the figure. A bar of aluminium splinting, 3 feet long (12 "divisions") is bent with the fingers to follow the outer curve of the shoulder, arm, and elbow. In an average patient this will bring the eighth rivet (counting from above) immediately beneath the olecranon. From this point, using the groove provided on the top of the fracture box for the purpose, a rectangular bend is made to carry the rest of the bar forwards along the ulnar border of the forearm. This curve is made away from the middle line of the body, and therefore fits a right or left arm as required.

Splint applied; dressings not shown.

The splint is completed by two short pieces, 9 in. long, connected by transverse pieces of aluminium tape 12 in. long, which are passed between the third, fourth, and fifth rivets of the long bar, and thus form a cage which wraps round and encloses the arm. Similar pieces, 12 and 10 in. respectively, are connected to the last foot of the bar, and form a cage for the forearm.

In the *Royal Army Medical Corps Journal* of March, 1916, there is a description of this splint as originally devised, without the forearm attachment or "cage." With this cage it is found that extension is easier to apply, and that there is greater rigidity and comfort to the patient.

### *Application.*

The application of the splint is simple, and takes but a few minutes. In cases of compound fractures, the wounds having been carefully dealt with under an anaesthetic and drainage having been established, etc., the dressings are applied in such a way that a sufficient clean area is maintained, and at the same time the gauze in immediate contact with the wounds can be changed through the "windows" of the cage, with the minimum amount of disturbance.

The shoulder-piece is fixed over a sufficiently thick pad of wool, and kept in position by tapes passing under the opposite axilla. Next, the upper cage is fitted closely round the arm, and the whole bandaged. The forearm is finally put up in any desired position. If the musculo-spiral nerve is damaged, the hand and wrist may be maintained in a dorsiflexed position by suitable adjustment of the lower cage.

In simple fractures care must be taken to preserve sufficient extension at the elbow.

The question of the position of the forearm with relation to the trunk must be considered. The patient is undoubtedly more comfortable for his journey with the forearm supported across the front of the chest, but in the majority of cases the lower fragment is rotated at right angles to the upper. The best position must be decided for each case individually and controlled by skiagrams.

The splint is approved by Colonel Cuthbert Wallace, A.M.S., and is used extensively by my colleague Lieutenant A. C. Bryson.

### *Conclusion.*

In conclusion, I should like to point out the importance of the system of aluminium splinting to those surgeons in hospital and private practice who are not yet acquainted with it. No hospital splint room will in future be completely equipped without a supply of the material, and, moreover, speaking from the experience of many of my friends and myself, few surgeons will in future care to be without the aluminium splinting material for their private work.

REFERENCE.

[1] BRITISH MEDICAL JOURNAL, December 4th, 1915.

* Described and figured in the *Memorandum* on the Treatment of Injuries in War, 1915.

## THE INHIBITORY ACTION OF SALIVA ON GROWTH OF THE MENINGOCOCCUS.

BY

LIEUTENANT-COLONEL M. H. GORDON, R.A.M.C.

IN March, 1915, when teaching some pupils to recognize colonies of the meningococcus in plate cultures made from material taken from the nasopharynx, it was thought that a simple method of demonstrating the first step in the identification of this micro-organism would be to mix a suspension of it with saliva, and to make a plate culture from the mixture.

This, accordingly, was done. It was found, however, that whereas numerous colonies of salivary bacteria, chiefly streptococci, developed, no colonies of the meningococcus appeared. A plate culture made at the same time from the meningococcus suspension yielded numerous colonies of this micro-organism. Clearly, then, in this instance, the saliva had inhibited growth of the meningococcus.

As Captain Colebrook of St. Mary's Hospital had recently shown me his discovery of the inhibiting power exercised upon the growth of the meningococcus by a Gram-positive coccus which he had found to replace the meningococcus in the nasopharynx of a carrier when the latter became "free," it occurred to me that possibly the present phenomenon might be an instance of a similar action. Equally, however, it might be due to some inhibitory

effect of the saliva itself, apart from any bacteria contained by it. The following experiments were made for the purpose of clearing the matter up.

EXPERIMENT I.

About one cubic centimetre of normal saliva was collected in a sterile test tube. This was then well mixed with a few drops of a broth suspension of meningococcus made by richly inoculating a broth tube from a twenty-four hours' nasgar culture. Droplets of this mixture were spread on two plates of nasgar and incubated. At the same time a control plate was inoculated from the broth suspension of the meningococcus.

*Result.*—Both plates from the mixture showed profuse growth of salivary bacteria, but no meningococcus colonies. As the control plate yielded a good crop of colonies of this micro-organism, it was plain that the saliva had inhibited growth of the meningococcus.

EXPERIMENT II.

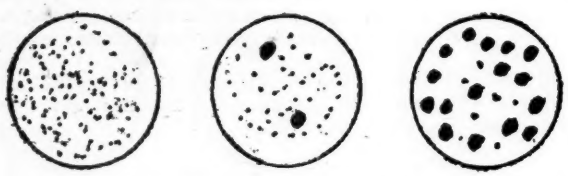
Saliva was smeared across a plate of nasgar in a band about a centimetre in diameter. Meningococcus suspension was smeared across in a similar band at right angles to the first. On incubation it was found that meningococcus appeared in sections of its band where the saliva had not been spread, but where the bands crossed only salivary bacteria grew.

EXPERIMENT III.

Meningococcus suspension was smeared all over the surface of a nasgar plate. A drop of saliva was then smeared over half of it. Meningococcus colonies only came up on the half of the plate where saliva had not been smeared.

EXPERIMENT IV.

A single drop of saliva was distributed over three nasgar plates in gradually diminishing proportion. A loopful of meningococcus suspension was then distributed over each plate in turn, care being taken to sow the same amount on all. The result was as follows:



1. 2. 3.

The fine dots represent colonies of salivary bacteria; the heavy dots represent colonies of meningococcus.

The first plate showed colonies of salivary bacteria only. The second plate showed the majority of the same and two colonies of the meningococcus. The third plate showed more colonies of the meningococcus and fewer colonies of the salivary bacteria. The colonies of the meningococcus, therefore, were in inverse proportion to those of the salivary bacteria.

EXPERIMENT V.

This experiment was made in order to ascertain in what dilution saliva loses the property of inhibiting growth of the meningococcus.

A cubic centimetre of saliva was submitted to a series of decimal dilutions. One-tenth of a cubic centimetre, first of saliva, then of each dilution in turn, was taken up in a series of capillary pipettes. An equal amount of meningococcus suspension was next drawn into each pipette and the contents well mixed, expelled on to a nasgar slope, and the latter incubated.

*Result.*

| Amount of Saliva Sown on Tube. | Growth of Meningococcus. |
|---|---|
| 0.1 c.cm. ... ... ... | *Nil.* |
| 0.01 c.cm. ... ... ... | Two colonies. |
| 0.001 c.cm. ... ... ... | Confluent over lower half of tube. |
| 0.0001 c.cm. ... ... ... | Confluent. |
| Control of meningococcus suspension only | Confluent. |

This experiment showed that the inhibition became diminished when the saliva was diluted one-hundredfold and over.

EXPERIMENT VI.—*Saliva from "Carriers."*

The preceding five experiments were made with saliva from normal individuals. The present test was made with saliva from "carriers." Through the courtesy of Captains Douglas and Colebrook, samples of saliva were obtained from six carriers who were at that time under treatment at St. Mary's Hospital. Although these six persons one and all harboured the meningococcus—or a micro-organism closely resembling it—in their nasopharynx, their saliva not only failed to show the meningococcus, but was found to inhibit growth of this micro-organism in the same way as samples of saliva from normal persons had been found to do.

EXPERIMENT VII.

Nasal mucus was obtained from three normal persons and tested in the same way against meningococci, with the result that, in contrast to saliva, it was found to have no inhibitory action on the growth of the meningococcus. The specimens of nasal mucus tested grew colonies of staphylococcus and of *M. catarrhalis* which did not impede development of the meningococcus.

EXPERIMENT VIII.—*Effect of Heating Saliva.*

A sample of saliva was divided into two portions. One was heated to 55° C. for half an hour. Both were then tested with regard to their capacity of inhibiting growth of the meningococcus.

*Result.*—Whereas the unheated saliva inhibited growth of the meningococcus as in previous experiments, the heated saliva was found to be completely void of this property. The plates from this heated saliva showed a profuse and pure culture of the meningococcus.

Heating, therefore, destroys the antimeningococcal action of saliva. It also destroys the salivary bacteria.

SUMMARY.

The experiments made up to this point demonstrated the following facts: Normal human saliva inhibits growth of the meningococcus on a nasgar plate. Saliva from carriers has the same effect. Nasal mucus from normal people has no such action. The inhibitory effect of saliva corresponds with multiplication of the bacteria indigenous to it. This anti-meningococcal property of saliva is destroyed by heating the saliva to 55° C.; so are the salivary bacteria.

EXPERIMENT IX.—*Effect of Centrifuging Saliva.*

Five cubic centimetres of saliva were centrifuged for four hours on a water centrifuge. The top and bottom layers were then compared with the uncentrifuged saliva in regard to inhibitory action on growth of the meningococcus.

*Result.*—The uncentrifuged saliva showed as before well-marked antimeningococcal action and a good crop of colonies of salivary bacteria. The bottom layer of the centrifuged saliva showed complete inhibition of the meningococcus and a confluent growth of salivary bacteria. The top layer, on the other hand, had lost the majority of its bacteria, and also to a great extent its inhibitory action upon growth of the meningococcus.

This experiment was repeated and confirmed on three separate occasions, using a high velocity electric centrifuge. It was found also that if, in spite of being centrifuged, the saliva contained many salivary bacteria in its upper layer, this portion still exerted an inhibitory action on growth of the meningococcus.

EXPERIMENT X.—*Comparison of Raw with Centrifuged Saliva.*

A suspension of meningococcus was made in broth. A series of capillary pipettes were then calibrated to hold the same volume of fluid. In three of these pipettes in succession one volume of raw saliva was mixed with one volume, two volumes, and three volumes respectively of meningococcus suspension and plated.

This was then repeated with centrifuged saliva. The result was as follows:

| | Growth of Meningococcus. |
|---|---|
| Raw saliva: | |
| 1 vol. + 1 vol. meningococcus suspension ... | Nil. |
| 1 vol. + 2 vols. ,, ,, ... | Nil. |
| 1 vol. + 3 vols. ,, ,, ... | Nil. |
| Centrifuged saliva: | |
| 1 vol. + 1 vol. meningococcus suspension ... | Excellent. |
| 1 vol. + 2 vols. ,, ,, ... | Excellent. |
| 1 vol. + 3 vols. ,, ,, ... | Excellent. |

While one unit of raw saliva inhibited growth of three times its bulk of meningococcus suspension, the same volume of saliva, after being centrifuged, failed to inhibit growth in an equal volume of suspension. A culture showed that the number of living meningococci in one volume of the suspension used in this experiment was approximately five hundred:

EXPERIMENT XI.—*Comparison of the Effect of Blood Serum, Saliva, and Centrifuged Saliva respectively from the Same Person.*

In this experiment equal quantities of the three materials in question were brought in contact with diminishing amounts of a meningococcus suspension, and, after admixture, plated. The results were as follows:

| Dilution of Meningococcus Suspension. | Blood Serum. | Raw Saliva. | Raw Saliva after being Centrifuged for 3½ hours. |
|---|---|---|---|
| Undiluted ... ... | +++ | − | +++ |
| 1:10 ... ... ... | ++ | − | + (one colony) |
| 1:100 ... ... ... | ++ | − | − |
| 1:1,000 ... ... | + | − | − |
| 1:10,000 ... ... | + | − | − |
| 1:100,000 ... ... | + (242 cols) | − | − |

+ = Growth of meningococcus.

The blood serum, as was to be expected, encouraged rather than inhibited growth of the meningococcus. The volume of suspension here used ($\frac{1}{50}$ c.cm.) contained approximately 24 million living meningococci—about 1,000 million per c.cm. The raw saliva completely inhibited an equal volume of this suspension. After being centrifuged, however, this inhibitory power of the saliva was reduced between 10 and 100 times—that is, a cubic centimetre of the saliva would now have inhibited between 10 and 100 million meningococci instead of over 1,000 million as before.

All of the cultures in the above experiment in which the meningococcus did not appear showed a good growth of salivary bacteria.

### Summary.

Up to this point, then, the investigation had shown that saliva inhibits growth of the meningococcus only so long as it contains in living condition its own natural flora. When the indigenous bacteria have been destroyed by heat, or removed by centrifuge, this inhibitory power is lost or diminished according as they are destroyed or greatly reduced in number.

### *Cultures made from Saliva.*

In order to test this provisional conclusion and to take the matter a step further, the investigation was now continued with cultures made from saliva.

### Experiment XII.

A flask containing 250 c.cm. of ordinary peptone broth was inoculated with two loopfuls of normal saliva and incubated at 37° C. In the course of twenty-four hours or so the broth became turbid from the growth of *Streptococcus salivarius* and other salivary cocci.

The contents of the flask were divided into four portions. These were treated as follows:

1. Was not interfered with.
2. Was heated to 55° C. for thirty minutes.
3. Was centrifuged for three hours.
4. Was passed through a Berkefeld filter.

A portion of each was mixed with an equal amount of suspension of meningococcus in a capillary tube, and then distributed over a plate of nasgar. The result given by these plates, after incubation, was as follows:

| No. | Material. | Result of Test. |
|---|---|---|
| 1 | Broth culture from saliva; 24 hours' growth at 37° C. | No growth of meningococcus; profuse growth of salivary streptococci. |
| 2 | Ditto, after being heated to 55° C. for 30 minutes | Pure and copious growth of meningococcus. |
| 3 | Ditto, after been centrifuged for 3 hours | No growth of meningococcus; profuse growth of streptococci. |
| 4 | Ditto, after passage through Berkefeld filter | Pure and copious growth of meningococcus. |

The broth culture from saliva, therefore, was found to inhibit growth of meningococcus in just the same way that saliva itself does. This action of the broth culture disappears when the bacteria contained by it are destroyed by heat, or when they are removed by a Berkefeld filter. The centrifuge failed to remove them in this experiment, with the result that the inhibitory action of the broth culture on the meningococci was retained.

### Experiment XIII.

In the following experiment a sample of saliva that had stood for forty-eight hours at room temperature was compared with two broth cultures therefrom (of twenty-four and forty-eight hours' growth respectively) as regards their capacity of inhibiting growth of the meningococcus.

This test was made quantitatively. Decimal dilutions from each of the materials tested were brought in contact with equal amounts of a suspension of meningococcus in capillary pipettes, and after thorough admixture the contents of each pipette were plated on nasgar.

The results, as regards growth of the meningococcus, were as follows:

| Material. | Undiluted. | 1:10. | 1:100. | 1:1,000. | 1:10,000. |
|---|---|---|---|---|---|
| 1. Saliva kept for 48 hours at room temperature | − | − | + | + | + |
| 2. Broth culture therefrom of 48 hours' growth | − | − | + | + | + |
| 3. Ditto of 24 hours' growth | − | − | − | + | + |

+ = Growth of meningococcus.

From this it appears that the twenty-four hours old broth culture was more active in inhibiting the meningococcus than either of the other two materials tested.

### Experiment XIV.

Three broth cultures, each from a single colony of the predominant micro-organisms present in the twenty-four hours old broth culture tested in the last experiment, were examined in the same way, with the following result. All of these cultures were of forty-eight hours' growth at 37° C.

| Material. | Undiluted. | 1:10. | 1:100. | 1:1,000 | 1:10,000. |
|---|---|---|---|---|---|
| Colony 1: *Streptococcus brevis* | − | + | + | + | + |
| Colony 2: *Streptococcus longus* | − | + | + | + | + |
| Colony 3: Staphylococcus | + | + | + | + | + |

+ = Growth of meningococcus.

From this it appears (1) that the staphylococcus had no inhibitory action on the meningococcus; (2) that both the streptococci held up growth of this micro-organism when undiluted, but lost this property when their broth culture underwent a tenfold dilution. These streptococci, therefore, were much less potent than the broth culture from which they had been isolated.

### General Summary.

1. Normal saliva inhibits growth of the meningococcus upon solid artificial culture medium (nasgar).
2. Saliva from carriers has a similar action.
3. Nasal mucus from normal persons has no such inhibitory effect on the growth of meningococcus.
4. A quantitative experiment showed that fresh saliva does not entirely lose this inhibitory influence when diluted a hundred-fold.
5. So pronounced is the antagonism of saliva to growth of the meningococcus in culture, that in a given experiment a volume of broth suspension containing living meningococci at the rate approximately of 1,000 million per c.cm. was prevented from growing by admixture with an equal volume of fresh saliva.
6. This antimeningococcal action of saliva is due to its living bacteria.
7. A young broth culture from saliva is at least as efficacious as fresh saliva in antimeningococcal action.
8. This effect is due to the living and multiplying bodies of the bacteria in the broth. When they have been separated off by a Berkefeld filter, or killed by heat, the broth has lost its antimeningococcal power.
9. The inhibitory action of saliva appears to be chiefly due to mixed salivary streptococci. Pure cultures of the predominant streptococci, when tested individually, were found to exert comparatively slight inhibitory influence on the growth of meningococcus.
10. These observations demonstrate the practical importance of avoiding contamination with saliva when swabbing the nasopharynx of suspected carriers of the meningococcus.

### Reference.

[1] Colebrook, L.: Bacterial Antagonism to the Meningococcus, *Lancet*, November 20th, 1915.

# THE BEHAVIOUR OF HYPOCHLORITES ON INTRAVENOUS INJECTION AND THEIR ACTION ON BLOOD SERUM.*

BY

H. D. DAKIN, D.Sc.

HYPOCHLORITE solutions containing variable amounts of free hypochlorous acid have been employed fairly extensively for the local treatment of infected wounds. Recently one of these solutions, "eusol," introduced by Professor Lorrain Smith and his co-workers, has been administered by intravenous injection with apparently successful results in cases of septicaemia and toxaemia.[1] It was of interest, therefore, to endeavour to determine some of the factors conditioning the action of this solution and related substances.

The object of the following communication is to describe certain experiments which appear to prove that hypochlorite solutions when injected intravenously in quantities similar to those employed for therapeutic purposes cannot exert any appreciable direct germicidal action. It should be noted that, with the exception of certain experiments by Cordova,[2] in which eusol given intravenously was stated to be capable of protecting rabbits from lethal doses of staphylococci and *B. capsulatus*, no direct curative effects have been claimed in cases of septicaemia in which organisms were isolated from the blood. Lorrain Smith, Ritchie, and Rettie state that "the method of intravenous injection may give favourable results in cases of general septic infection in the field, gangrene, tetanus, and other kindred conditions characterized by toxaemia."

### 1. *Quantitative Relations.*

Eusol has been used for intravenous injection in man in doses ranging from 60 c.cm. to 100 c.cm. An average full dose may be taken to be 100 c.cm., corresponding to 0.27 gram of hypochlorous acid. This amount is at once diluted with four or five litres of blood, so that the possible concentration of hypochlorous acid, assuming that no decomposition of the drug by the blood occurs, is not more than 50 to 65 mg. of hypochlorous acid per litre. Even if this concentration persisted temporarily, which will shortly be shown not to be the case, it is much below the concentration of hypochlorite at which active direct action is observed, when tested against organisms such as *B. coli* or staphylococci suspended in blood, or even in serum.

Direct experiments in which *B. coli* or s aphylococci were mixed with sterile rabbit serum or plasma, and then 70 mg. per litre of hypochlorous acid in the form of eusol added, showed no marked diminution in the number of organisms in the course of two hours when compared with a control experiment in which no hypochlorous acid was added. Precisely similar results were obtained when the hypochlorous acid solution was injected intravenously into rabbits, and the serum taken before and after the injection was tested against *B. coli in vitro*. The following are typical results. The concentration of hypochlorous acid added was 70 mg. per litre in all cases.

| Mixture. | Organisms per drop, $\frac{1}{10}$ c.cm., at end of two hours. |
|---|---|
| 1. Normal serum + *B. coli* ... ... ... ... | 780 |
| " " + *B. coli* + HClO ... ... | 640 |
| 2. Normal serum + *B. coli* ... ... ... ... | 1120 |
| " " + *B. coli* + HClO ... ... | 1280 |
| 3. Normal serum + *B. coli* ... ... ... ... | 1640 |
| Serum after injection HClO + *B. coli* ... | 1760 |

The changes are in no case significant. Miss Chick[3] has already shown that normal rabbit serum has practically no action on *B. coli* during the first few hours of action. The above experiments followed the technique described in Miss Chick's paper.

### 2. *Fate of Hypochlorites on Intravenous Injection.*

Hypochlorous acid or its salts exert their known antiseptic action on account of the active chlorine contained in them. This active chlorine may occur in two forms: that present as unchanged hypochlorite, and chlorine loosely bound to amino compounds, including proteins. Chlorine in both of these forms is able to liberate iodine from an acidified solution of potassium iodide, and hence may be easily detected. The antiseptic value of the chlorine loosely bound to amino compounds, in "chloramine" form, probably varies as the ease with which it can be detached so as to permit of union with other substances, including bacterial protoplasm. But hypochlorites can combine with a variety of substances by reactions of a different kind from that just mentioned. Thus, for example, the chlorine may become attached to carbon atoms present in proteins and other substances, and then loses its power of liberating iodine from potassium iodide, and confers no germicidal properties on the product. Furthermore, it is probable that direct reduction of hypochlorites to chloride may occur in the body, for this is a common reaction *in vitro*. Thus it is seen that hypochlorites may be decomposed and lose their germicidal properties by a variety of reactions. Changes of this nature apparently occur with great rapidity when hypochlorous acid or its salts are injected intravenously, for a much greater quantity of "eusol" per kilo of body weight than is used therapeutically may be injected intravenously into animals without the appearance of a detectable trace of active chlorine in the plasma or serum.

The following is a typical experiment. Under ether anaesthesia cannulae were placed in the carotid artery and femoral vein of a rabbit weighing 1,820 grams. Eusol of about half-strength (1 c.cm. = 1.3 mg. hypochlorous acid) was injected into the vein, and almost immediately afterwards blood was drawn from the artery into citrate solution, rapidly centrifuged, and the plasma tested as promptly as possible for active chlorine by adding potassium iodide, acetic acid, and excess of dilute starch paste. Control experiments showed that the citrate did not interfere with the reaction; 7 c.cm. of the eusol were injected fairly rapidly, and then the first sample of blood was withdrawn. Further samples of blood were taken after each additional injection of 2 c.cm. of eusol. Although haemolysis was detectable in all samples of blood, and was very marked in the later ones, no trace of active chlorine was found in the plasma obtained after the injection of 19 c.cm. of the hypochlorite solution, and only a doubtful reaction was obtained after further additions which finally killed the animal.

The volume of blood in the rabbit used in this experiment may be taken as approximately 125 c.cm., so that it is calculated that at least 200 mg. of hypochlorous acid may be added to each litre of circulating blood before any detectable trace of active chlorine appears in the plasma. This amount is more than three times the therapeutic dose. It may be noted incidentally that the minimal addition of hypochlorous acid to blood serum that will produce a positive reaction for active chlorine confers no added germicidal properties.

It might be suggested that in the foregoing experiment active chlorine could not be detected in the blood plasma on account of its being taken up by the cells. But special experiments showed that blood serum from rabbits and sheep required the addition of from 35 to 80 mg. of hypochlorous acid per litre before any active chlorine persists. Finally, it may be noted that if circulating or drawn blood is mixed with an amount of hypochlorous acid just sufficient to yield a plasma or serum giving a definite positive reaction for active chlorine, the latter rapidly disappears in the course of a short space of time.

From the foregoing experiments it appears in the highest degree improbable that any direct germicidal effects can be ascribed to hypochlorous acid or its salts when injected intravenously in the prescribed therapeutic doses.

### 3. *Other Effects of Hypochlorites when given Intravenously.*

When hypochlorite solutions are injected intravenously into rabbits a certain amount of haemolysis is observed even with doses as low as 1.5 c.cm. of eusol = 4 mg. of hypochlorous acid per kilo of body weight. With larger doses the haemolysis becomes more intense and the

* The work here referred to was done with the assistance of a grant from the Medical Research Committee. The experiments were made in the laboratories of the Committee's Department of Biochemistry and Pharmacology. I am indebted to Dr. H. H. Dale, F.R.S., for much helpful advice and for facilitating my work in every way possible.

coagulability of the blood becomes diminished.* When lethal doses of hypochlorite preparations or chloramine-T are given intravenously a marked increase in the pericardial fluid and oedema of the lungs is commonly observed. It appears that in large doses the substances act as definite endothelial poisons.

Since the experiments already referred to appear to prove that hypochlorite preparations given intravenously can exert no appreciable direct germicidal action, it appeared conceivable that the favourable clinical results stated to follow their employment might be due to an indirect action in stimulating the production of antibodies. Thus far I have only had the opportunity of investigating the effects of hypochlorites given intravenously on the antitrypsin of the blood. The results seem of interest since Wright and others have suggested that antitrypsin plays an important part in the normal antibacterial properties of blood. Whether eusol or other hypochlorite preparations act as a stimulus for the production of other non-specific antibacterial and antitoxic substances is a question that requires further investigation.

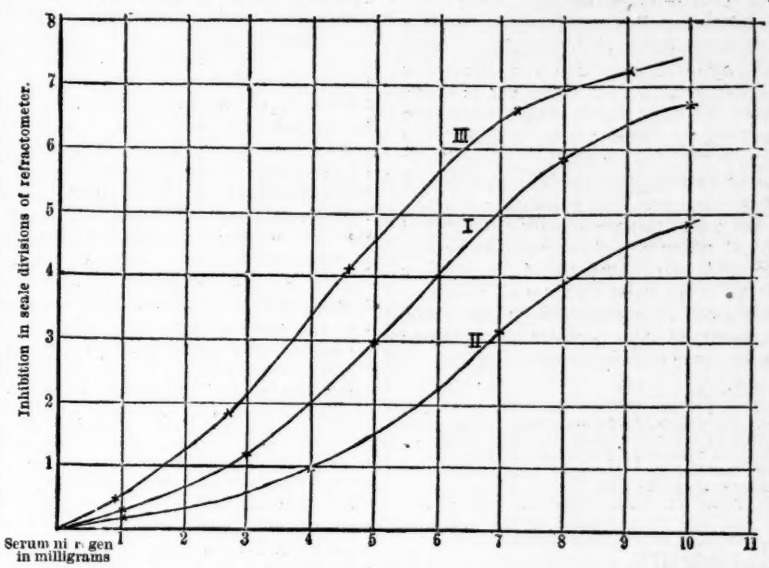



CHART 1.—Showing reduction in antitryptic action of blood after injection of eusol, followed by increase above normal. I, Before injection; II, immediately after; III, twenty-four hours after.

For the experiments on the effect of hypochlorite given intravenously on the antitryptic action of the blood I enjoyed the co-operation of Dr. G. S. Walpole (and his assistant). An exceptionally precise method devised by him was employed, the details of which will be published shortly. The method essentially consists in the estimation by means of the dipping refractometer of the products of tryptic digestion, resulting from the interaction of constant quantities of trypsin and casein in the presence of varying amounts of blood serum. I am much indebted to Dr. Walpole for permission to make use of his method and results.

It was found that when small amounts of hypochlorite, either in the form of eusol or neutral sodium hypochlorite, are injected intravenously into rabbits, a fall is observed in the antitryptic action of blood serum taken immediately after the injection. But if another sample is taken twenty-four hours after the injection, it is commonly found that recovery in antitryptic action has proceeded to a point significantly in excess of the original value before hypochlorite was given. A typical example is shown in Chart I, in which the actual inhibition of tryptic digestion due to antitrypsin, and expressed in scale units of the refractometer, is plotted against the varying amounts of serum, which, for uniformity, are reckoned in milligrams of total nitrogen. The curve marked I represents the initial antitryptic action of the blood serum; that marked II the antitryptic action of the blood serum taken immediately after the injection of 5 c.cm. of eusol (= 14 mg. of hypochlorous acid) into the ear vein of the rabbit, which weighed 1,940 grams; and that marked III, the antitryptic action of the blood serum taken twenty-four hours after the injection.

Similar effects were found to follow the injection of comparable amounts of sodium hypochlorite. The action of hypochlorites in causing a primary fall in the antitryptic action of the blood serum, followed by a secondary increase, is shared by many other substances.

4. *The Action of Hypochlorites and of Chloramine-T on Blood Serum.*

The rate of decomposition of hypochlorites by blood serum is a question of some importance in connexion with the local treatment of infected wounds, since the results afford some indication of the way in which the active mass of the antiseptic may become rapidly diminished. In the case of both eusol and neutral sodium hypochlorite a curious fact was observed—namely, that a small amount of serum may bring about the disappearance of more active chlorine in a given time than will larger amounts of the same serum. This somewhat paradoxical reaction, which was independently observed by Dr. Harden, is best illustrated in the form of a chart showing the disappearance of active chlorine titratable with potassium iodide and sodium thiosulphate, when a constant volume of hypochlorite is mixed with varying amounts of serum, and allowed to stand for thirty minutes at 20°. Similar results were obtained when the reaction was allowed to continue for a longer period. The typical results shown in Chart 2 were obtained by mixing 5 c.cm. of neutral hypochlorite containing 12.6 mg. of hypochlorous acid with varying amounts of sheep serum.

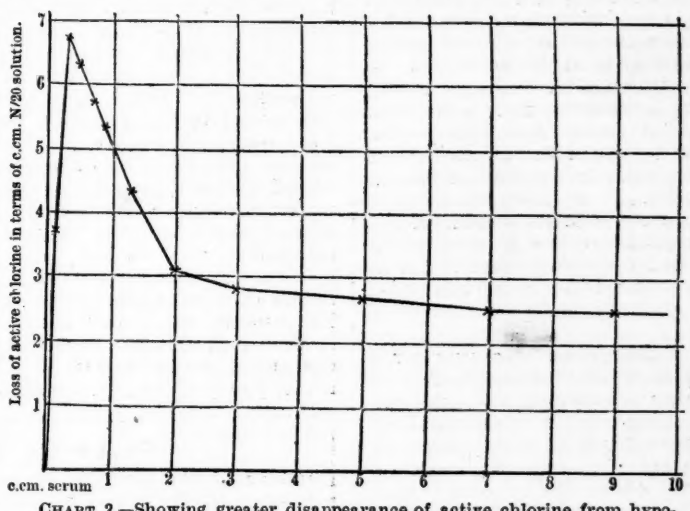



CHART 2.—Showing greater disappearance of active chlorine from hypochlorite solution when treated with small amounts of serum than with large.

The explanation of this curious action of small amounts of serum on hypochlorite is to be found, I believe, along the following lines. When the mass of the protein in the blood serum is relatively small compared to that of the hypochlorite the amount of chlorine taken up per molecule of protein is large, and the product becomes unstable and is readily hydrolized. This hydrolysis has the effect of liberating from the protein more amino-acid complexes, which can react with additional hypochlorite. Now Langheld has shown that amino-acids react with hypochlorites to form the sodium salts of mono- and di-chloramino-acids, and it is now known that these

* It has been stated that only eusol can be injected with safety, and that sodium hypochlorite must not be used. I have been unable to detect any significant difference between the effects of eusol and sodium hypochlorite prepared according to the formula given in the BRITISH MEDICAL JOURNAL, August 28th, 1915.

substances decompose spontaneously to give aldehydes or nitriles respectively, with liberation of carbon dioxide, while the chlorine is converted into inactive chloride.

$$\text{R. CHNH}_2\text{.COOH} \xrightarrow{+\text{NaClO}} \text{R. CHNHCl.COONa} \xrightarrow{+\text{H}_2\text{O}}$$
$$\text{R.CHO} + \text{NaCl} + \text{CO}_2 + \text{NH}_3$$

$$\text{R. CHNH}_2\text{.COOH} \xrightarrow{+2\text{NaClO}} \text{R. CHNCl}_2\text{.COONa} \rightarrow$$
$$\text{R. CN} + 2\text{NaCl} + \text{CO}_2$$

I have observed that when small amounts of serum are acted on by relatively large amounts of hypochlorite, both gas production and aldehyde formation are much more pronounced than when the relative mass of serum is large. The fact harmonizes with the suggested explanation of the reaction between hypochlorites and serum. When the mass of serum is large in relation to the hypochlorite, it appears that the smaller amount of chlorine taken up by the protein does not confer on the product such instability as is seen in the case of more highly chlorinated substance. Chloramine-T, when added to serum, does not react like hypochlorite, but is decomposed to a smaller extent, varying directly with the relative mass of serum.

The above experiments are of a preliminary character, and it is hoped that some of the practical questions arising from them may be more closely investigated.

REFERENCES.

[1] J. Lorrain Smith, Ritchie, and Rettie, BRITISH MEDICAL JOURNAL, November 13th, 1915, p. 716. [2] Cordova, BRITISH MEDICAL JOURNAL, May 6th, 1916, p. 651. It should be noted that the lethal doses of *B capsulatus* and staphylococci recorded by Cordova in his control experiments are very much smaller than those generally observed. [3] Miss Chick, *Journal of Hygiene*, 12, p. 414, 1913.

# Reviews.

## LOCALIZATION BY X RAYS AND STEREOSCOPY.

*Localization by X Rays and Stereoscopy*[1] is the title of a book by Sir J. MACKENZIE DAVIDSON which is published at an opportune time, seeing that the exact localization of foreign bodies within the human body is of such vital importance when so many wounded have to be dealt with accurately and with rapidity. Many time-saving methods of localization have been devised during the past eighteen months, mostly based on Davidson's original cross-thread method; few, if any, of these are quite so accurate. The stereoscopic method, also a discovery of the author, has not been, and is not, used so extensively as it should be. The simplicity of technique in the taking of such radiographs, the theory, and the way to apply the results are all well set out in this work, which, after dealing with the *x*-ray tube and secondary radiations and protection, describes in detail the use of stereoscopic radiographs. The last chapter, and one to which the author directs especial attention, is on the precise localization of foreign bodies in the eye and the orbit. If anything was wanting in the previous chapters to convince the reader of the accuracy possible in localization, this last chapter would supply that want, for in dealing with foreign bodies in these situations Davidson's method may be said to stand alone, its simplicity and accuracy being little short of marvellous.

On p. 22 will be found a description of a new *x*-ray couch which for simplicity of design, for adaptability to war work at the front, for ease and cheapness of construction, and for efficiency in doing what it is meant to do, will be hard to beat. Accompanying this is a very ingenious screen instrument which, when used with this couch or others of similar design, will enable the operator to read off on a scale the depth of a foreign body under a marked skin spot. In advocating stereoscopy attention is drawn to "the misleading single picture." With a knowledge of what is going on at the present time, with much of the war work being done by unskilled and even untaught *x*-ray operators, and with surgeons inexperienced in radiography, greater stress might well have been laid on this point. If the author had suggested that for a surgeon to act on the showings of a single radiograph when searching for a bullet was almost criminal, he might not have been going too far. The illustrations are excellent and an important feature. Many diagrams help materially in the understanding of the *x*-ray descriptions, and at the end are a number of very beautiful reduced stereoscopic radiograms which can be viewed with one of the small, cheap stereoscopes so much in vogue. Whilst the expert in radiography can learn much that is of value from this publication, it is nevertheless of even more value to the surgeon, and especially to those surgeons who at the present time are attached to the army.

[1] *Localization by X Rays and Stereoscopy.* By Sir J. Mackenzie Davidson, M.B., C.M.Aberd. London: H. K. Lewis and Co., Ltd. 1916. (Roy. 8vo, pp. 85; 26 plates, 61 figures. 7s. 6d. net.)

## MEDICAL ETHNOLOGY.

*Medical Ethnology*,[2] by Dr. WOODRUFF, will interest students of anthropology and possibly also those of tropical medicine. The work was begun, the author tells us in the preface, as a revision of the first edition of *The Effects of Tropical Light on White Men*, but it was necessary to change the title because so many other factors besides pigmentation have entered into the discussion of the reasons for the differences between the present races and sub-races of men.

The subjects discussed in the twenty chapters include the effects of light on man, the question of pigmentation, actino-therapy, the cause of the extinction of migrants, ethnic psychology, etc. One thing the work brings out very clearly is the slender basis on which rests the hope that the white man will ever be able to inhabit the tropics—that is to say, to live there for good, breeding and propagating his species, even when all the diseases have been eradicated from them. Dr. Woodruff gives a good example of the mania amongst some people to deny that climate can affect any one. "The most notorious case was that of Civil Service Commissioner Washburn, who stated that the climate was not harmful if one was moral and sober, and that if he did break down recovery was possible there. Within a few months he himself collapsed and had to go away to get well." Similar cases can easily be quoted from British colonies, one example that is often mentioned being the sad end of a man who was trying to get other people's leave cut down, but before he had progressed far in his endeavour was himself removed by death. The advocates of the white man for the tropics seem to forget all about neurasthenia, irritability of temper, and loss of memory, or evidently do not consider them as diseases. These are, however, the very things that finish off so many people and render them unfit for further efforts in a hot climate. Make the tropics healthy by all means, so that the constant stream of migrants to them may have a chance of returning home again fit and well, but do not delude white people into the belief that if disease is stamped out they can make a permanent home there. In writing his book Dr. Woodruff has quoted largely from the literature, and incidentally has perpetuated many of the mistakes to be found in it—for example, the part on heat exhaustion, on p. 136, is hopelessly involved, and even distinctly misleading. Again, we cannot agree with him in all he says as regards light as compared with heat in producing symptoms. Statements also, such as that cases of chronic malaria have been cured without quinine by a five-minute dose of *x* rays to the enlarged spleen, would have been better omitted. The question of why certain races are found in some parts of the world and not in others is, however, a fascinating one, and a perusal of Dr. Woodruff's book will give the reader plenty of food for thought.

[2] *Medical Ethnology.* By C. E. Woodruff, A.M., M.D. London: W. Heinemann. 1916. (Med. 8vo, pp. 328. 10s. net.)

## NOTES ON BOOKS.

READERS of the BRITISH MEDICAL JOURNAL will have studied with profit and amusement the articles on the *Minor Horrors of War* written by the Master of Christ's College, Cambridge. The articles have been collected into two volumes, of which the first was reviewed in our issue of April 17th, 1915. The second series, entitled *More Minor Horrors*,[3] contains fourteen chapters, of which ten have already appeared in this JOURNAL. The book gives very readable accounts of such pests as cockroaches, the bot-fly, the mosquito, the biscuit weevil (so familiar to readers of Clark Russell's nautical novels), the fig-moth, the stable-fly, rats, and the field-mouse. There are

[3] *More Minor Horrors.* By A. E. Shipley, Sc.D., Hon. Sc.D. Princeton, F.R.S. London: Smith, Elder, and Co. 1916. (Cr. 8vo, pp. 177; 49 figures. (Paper, 1s. 6d. net; cloth, 2s. net.)

numerous excellent illustrations; the book is written in most attractive style, and should have a wide popularity and sale.

The second edition of Dr. BARCLAY'S short textbook on *Elementary Anatomy and Physiology*,[4] is meant for junior students, nurses, and teachers. It contains short sketches of such subjects as biology, embryology, comparative anatomy, and haemolysis. It is written in conversational style, and from the popular point of view, and is full of facts and information, and also of the general deductions to be drawn therefrom. The brief table of contents given above shows that Dr. Barclay covers a vast amount of ground in the volume; as he says in the preface, he holds that "a good macroscopic view of a wide area is better than a microscopic knowledge of many disjointed points." How far the inexpert reader will be able to master some of the subjects reviewed, and admirably reviewed, in the newly-added chapters of this textbook is a matter that only experience can decide. The text is well written, and the illustrations have been generally well chosen.

As a globe-trotter Sir FREDERICK TREVES has few compeers. A dozen years ago he went round the world sight-seeing, and "did" the Mediterranean and Red Sea, India, Burma and Ceylon, China, Japan, and America. The impressions of this delightful journey he published in 1905 in a volume entitled *The Other Side of the Lantern*, which has now been republished in a cheap and popular form.[5] There is a moderate amount of the guide-book about Sir Frederick's work, there are a few pages of history, a few purple patches of rhetoric. For the rest he shows himself an admirable guide and interpreter for the man in the street; his faithful pen always maintains the same level of interest, his eye is quick to seize the salient points of what it views, and the itinerary he followed was carefully chosen to include the best known sights in every continent. The volume is excellently got up and illustrated, a marvel of cheapness. It should command a wide audience of readers.

[4] *Lectures on Elementary Anatomy and Physiology.* By H. Clifford Barclay, M D., Ch..., F R.C.S E., M R.C.S., L.R.C.P., Major R.A.M.C Second edition. London: Baillière, Tindall, and Cox. 1915. (Demy 8vo, pp. 295; 57 figures. 6s. net.)

[5] *The Other Side of the Lantern.* By Sir F. Treves, Bt., G.C.V.O., C.B., LL.D. London, New York, Toronto, and Melbourne: Cassell and Co., Limited. 1916. (Demy 8vo, pp. 438; 8 illustrations. 2s. 6d. net.)

## GOAT'S MILK.

WE are interested to learn that the guardians of St. Marylebone have begun the establishment of a flock of goats to yield milk for the younger children in their schools. They have, it is stated, obtained six goats, and it may be presumed that if the experiment is successful the scheme will be extended; in this way something may be done towards increasing the popularity of goat's milk in this country, where at present it is very little used. The late Dr. Vivian Poore took a great interest in the use of goat's milk, and for some years before his death most of the milk consumed in his house at Andover was obtained from a few goats. To the objection that the milk often had a disagreeable flavour, he replied that this could be completely obviated if the he-goat was not allowed to run with the nannies during the time they were in milk.

Less than twenty-five years ago Professor Nocard, in speaking of the 130,000 goats and kids which at that time were brought into Paris every spring for slaughter in the shambles of La Vilette, said that amongst all these animals the meat inspectors had never found a single case of tuberculosis. In that statement lies the essence of the argument in favour of goat's milk as a substitute for cow's milk. Despite all the efforts of legislators, the danger of infection through the milk of diseased cows still exists; but goats, if not actually immune, are very refractory to the attacks of the tubercle bacillus. It is a curious fact, however, that in spite of its manifold advantages, goat's milk has never become really popular in these islands, although in many other countries it is a common article of diet, and in some parts of France and Switzerland the goat often takes the place of the wet nurse, to the satisfaction of all concerned. In the memoirs of Madame Héritte-Viardot, niece of Manuel Garcia, the inventor of the laryngoscope, we find the author recording her indebtedness to a couple of goats which furnished milk for her little son during a voyage from England to the Cape, which in those days (1863) was no light undertaking, particularly for an infant. She writes:

> My little boy had been born a short time before our departure, and we were obliged to make special arrangements for him during the voyage. At the last moment the wet-nurse refused to go, and, to the indignation of my relations, I decided to take a goat (or rather two goats in case one got ill) in her place. The French consul at Southampton, our place of embarkation, procured the animals for me and they were kept on deck in a railed-off place, and milked by the cook twice a day. One morning there was not a drop of milk. The sailors had milked the goats for their own benefit, and I was obliged to have a padlock put on the enclosure. For some days all went well; then suddenly one of the goats was taken ill and her milk left her. The other luckily continued to thrive. There was a young married woman on board with a baby and a wet-nurse. The latter lost her milk, and my goat had to feed both children. How thankful I felt that I had not listened to my family.

For some years past a movement has been on foot to popularize the milk of "the poor man's cow," and at least two societies—the National Goat Club and the British Goat Society—have been formed for the purpose of making it better known throughout the British Isles. At the Children's Welfare Exhibition, held at Olympia a couple of years ago, a model goat farm was exhibited by a lady who has made a special study of the subject. Her own experience had convinced Mrs. Lacy-Hulbert that goat's milk is not only superior to cow's, but is an excellent substitute for human milk, and that whilst the endowment of every man with "three acres and a cow" may be the dream of idealists there is no reason why even the poorest cottager should not possess a goat which would supply his family with pure whole milk, such as it might be impossible for him to buy in many country places, even if he had the money. Once the initial expense of purchase has been met, a goat, when circumstances are favourable, may cost very little to keep, as a considerable part of its food may consist of garden waste or of what the animal itself may find in its browsings along the roadside and hedges. Many goats thrive well when stall-fed, but this, of course, costs a good deal more money. The animal can be kept in health if it has a clean, dry, and well-ventilated shed to serve as a stable and a small yard or enclosure in which it can take occasional exercise. A goat, in fact, if it is hand-fed, does not require more space than a St. Bernard dog; and, if well-treated, may yield as much as 4 to 5 pints of milk a day, or even more. The milk is believed to be more easily digested than cow's milk, the curd being more soluble and the fat in finer emulsion. The goat will not touch dirty food and is far cleaner in its person and habits than a cow; its milk need not be boiled or pasteurized unless it has to be kept in hot weather. The characteristic odour sometimes emitted by goat's milk when it has been left standing may be avoided by scrupulous attention to cleanliness by the precaution already mentioned.

The most recent analysis of goat's milk we have been able to find is in Neumann's letters to a young practitioner on the treatment of children's diseases, edited by Oberwarth (*Ueber die Behandlung der Kinderkrankheiten*, 1913). The figures for human and cow's milk are quoted from Langstein and Meyer, but the source of those for goat's milk is not stated. We have added the figures for Alpine goats given by Crepin, who has laid stress on the variations in the composition of the milk of different breeds of goats.

| | | Proteins. | Fat. | Sugar. | Ash. |
|---|---|---|---|---|---|
| Human ... ... ... | | 1.2 | 4.0 | 6 to 7 | 0.18 |
| Cow ... ... ... ... | | 3.4 | 3.4 | 3 to 4 | 0.76 |
| Goat | German ... ... | 3.67 | 4.3 | 3.6 | 0.8 |
| | Alpine ... ... | 2.3 | 3.1 | 4 1 | 0.7 |

In some varieties of wild goats the percentage of fat may be as high as 4.8 on the average, with an extreme upward limit of 8.7. Crepin is of opinion—and Lesage, from his experience in Paris, appears to agree with him—

The British Goat Society issues a monthly circular (price 3d.), which can be obtained from Mr. H. S. Holmes Pegler, honorary secretary, Coombe Bury House, Kingston Hill, Surrey. The society is holding a goat show on July 11th in connexion with the Richmond dog show on the same day.

that the objection which has been raised to goat's milk that it is too rich does not apply to stall-fed goats.

The quantity of milk yielded by a goat varies very much, and is influenced by the breed and by other conditions. The yield seems to be usually greater after the second kidding than after the first. The estimates of the average yield are very far from consistent. Neumann speaks of 4 litres (about 7 pints), and considers that even with this high yield goat's milk is not cheaper than cow's milk if, as he would appear to mean, the animal is stall-fed. The advantages he recognizes are that if a goat is kept by the consumer it is possible always to have fresh milk, and that the risk of tuberculosis is small. Lesage concludes that the advantages of goat's milk are (1) that a goat eats about one-sixth of the quantity of food required by a milch cow; (ii) that for nine or ten months it yields 3 to 5 litres of milk, which can be taken uncooked; (iii) that goats are very seldom affected by tuberculosis, since of 3,000 killed at the Lyons slaughterhouse only 5 were tuberculous; and (iv) that the fat being in very fine emulsion is easily digested. On the other side of the account must be put the liability of the goat to carry the infection of undulant fever (Mediterranean fever). In Great Britain this risk is small and, save in very exceptional circumstances, may be neglected.

The period of gestation in the goat is said to be about five months (150 days), and the average period in milk about nine months. In this country the daily yield may be expected to be about three pints; five points is considered a high yield. The small yield of British goats is attributed to degeneration of the stock due to excessive in-breeding. The Board of Agriculture will not grant quarantine licences for the importation of stock goats for breeding purposes, owing to the risk of the importation of goats infected with undulant fever. The danger undoubtedly exists, but it seems not unreasonable to ask that a few picked animals should be admitted under special licences given after full inquiry. Certain breeds of foreign goats yield not only a large daily quantity of milk for a longer period, but, what is almost equally important, breed at more than one season, so that the owner of even a small herd may reckon with certainty upon a continuous supply of milk throughout the year.

From what has gone before it appears that theoretically the keeping of goats might be expected to do something towards the solution of the milk question, especially in suburbs or the outskirts of small towns, and especially in country districts, where it is often particularly acute. The great merits of the goat from the medical point of view are, first, that it is very rarely affected by tuberculosis, and secondly, that if the animal is kept by the consumer himself the necessity for manipulating the milk in various ways, for storing it, and sending it long distances by train, as happens commonly with cow's milk, is obviated. On the other side is the liability of the goat to undulant fever, which in this country is not at present, at least, a serious risk, and the uncertainty of the yield and of maintaining a steady supply, unless several goats are kept.

If goat keeping is to do anything of importance towards solving the milk difficulty it is clear that a good deal of organization will be necessary. It does not seem that it would be prudent to expect a goat to be in profitable milking for more than one year out of eighteen months, or perhaps fifteen months out of two years, remembering the period of gestation and allowing a reasonable interval after the animal dries off. For a regular supply, therefore, two or more she-goats must be kept and a he-goat must be available. These considerations seem to lead to the conclusion that a system of co-operation in areas is essential if the goat movement is to be put on a practical basis and to have the important and far-reaching results, especially in regard to the health of infants and children, which its enthusiastic promoters believe it capable of achieving.

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ACCORDING to the twenty-second annual report of the Craig Colony for Epileptics, New York, there are colonies for epileptics in thirteen States of the American Union. It is estimated that there are 200,000 epileptics in the States, and that only 3½ per cent. are properly cared for. Of 1,320 deaths in the Craig Colony, 513 were due to causes related to epilepsy. In 600 autopsies gross brain lesions were found in about 60 per cent., but in only a few was there any condition that could have been treated surgically.

## BRITISH PRISONERS IN GERMANY.

Two White Papers relating to the treatment of British prisoners of war and interned civilians in Germany have recently been issued. One contains correspondence between the Foreign Office and the United States Ambassador in Berlin, which is a record of the action taken by Mr. Gerard at the request of Sir Edward Grey, from October 13th, 1915, to April 6th, 1916. The camps reported on by Mr. Jackson and other representatives of the Ambassador are Stendal, Schneidemühl, Wülzburg, Halle, Wittenberg, Castle Celle, Spreenhagen, Munich, Ingolstadt, Burg, Blankenburg, Quedlinburg, Dyrotz, Merseburg, Königsmoor, Hakenmoor, Fürstenberg, Crefeld, Friedberg, Mainz, Cassel and Langensalza, Soltau, Gütersloh, Güstrow, Döberitz, Neisse, Gnadenfrei, Wildemann, Clausthal, Bischofswerda, Spandau, Hannover, Münden, Göttingen, Tegel, Limburg, Giessen, Darmstadt, Mannheim, Heidelberg, Cologne, Germersheim, Villingen, Stuttgart, Weilburg, Madgeburg, Bayreuth, Kronach, Nürnberg, Würzburg, Hammelburg, and Landau. It is outside our province, even were space available, to summarize the reports; we can only touch on the points which have a directly medical interest.

Mr. Lithgow Osborne states that on October 29th, 1915, he visited the camp at Wittenberg. Among the British prisoners it was generally admitted that the food was sufficient in quantity and that it had recently greatly improved in quality. He had tasted it in the kitchen, and what he heard from the men confirmed him in his opinion that, apart from the sameness, the rations provided conformed to the standard necessary for good health. There were no complaints as to sanitation, and Captains Priestley and Vidal stated that the general health of the camp had been excellent since the disappearance of the typhus. There were many complaints as to the treatment of the prisoners in the matter of clothing, the delivery of parcels, and other matters; these the commandant, who seemed to have an unfriendly feeling to the English, was indisposed to consider. Mr. Osborne says that at Wittenberg those in authority, instead of regarding their charges as honourable prisoners of war, looked upon them as criminals whom only a régime of fear would suffice to keep in obedience. "All evidence of kindly and humane feeling between the authorities and the prisoners was lacking." On November 8th, 1915, Mr. Gerard himself visited the camp, and the impression which he derived from a careful examination of the camp and from long conversations with the prisoners was even more unfavourable than he had been led to expect. On November 22nd an inspection was made, on the order of the United States Ambassador, by Dr. Karl Ohnesorg, surgeon U.S. Navy; he reports favourably on the lazaret, but says that "unfortunately much had taken place in the camp which was not in accordance with recognized rules for the treatment of prisoners of war." He adds that this, happily, was changed, and the two medical officers, as well as the soldiers with whom he talked, said that then they had no complaints to make. The camp was again visited by Dr. Ohnesorg and Mr. E. L. Dresel on March 10th, 1916; they noted a decided improvement since the previous reports. A new commandant, General von Studtwitz, had been appointed and had made a number of changes for the better. The clothing was entirely satisfactory and the canteen arrangements seemed to be sufficient.

At Stendal there were complaints that the prisoners were ill supplied with clothing, and that the food was very unsatisfactory. The camp was visited by Mr. Osborne on November 4th, 1915; he reported that while the men said the food was "not what they were used to," and that they lived largely on the contents of parcels sent from home, they admitted that, if necessary, they could live on the camp rations and still keep in good health. Mr. Osborne again visited the camp with Mr. Dresel on March 2nd, 1916, and reported further improvements. These reports, however, should be compared with Dr. Ribadeau-Dumas's account of Stendal, a summary of which appeared in the BRITISH MEDICAL JOURNAL of June 3rd (p. 801).

The reports on the other camps are on the whole favourable. The chief complaint as to food was that it was monotonous and unpalatable. At Döberitz Mr. Jackson was told by some Englishmen who worked in the kitchen

that their countrymen lived entirely on what was sent from home. The sanitation of these camps is described as good, and the physical condition of the men as excellent. It is satisfactory to record that some prisoners bore testimony to kind treatment received from German medical officers. As far as it goes, the correspondence shows that there has been a considerable improvement in the German prison camps since last year. But in view of the statements made by men who have been repatriated and of accounts by Frenchmen and others of the way in which they have been treated, the evidence of the American inspectors, most praiseworthy as the efforts of Mr. Gerard and his colleagues have been, cannot be accepted altogether without reserve.

*The Food Question at Ruhleben.*

The other White Paper contains a report by Dr. A. E. Taylor on the conditions of diet and nutrition at the internment camp at Ruhleben; it is addressed to the United States Ambassador, and forwarded by Mr. Gerard to Sir Edward Grey. Writing on May 1st, 1916, Dr. Taylor states that he visited that camp during ten days, spending a number of hours there every day. He studied the diet for one week, qualitatively and quantitatively, witnessing the weighing of the food, and eating the midday meal himself. From the standpoint of their relation to the diet the men confined in Ruhleben may be divided into five groups: (*a*) The so-called pro-German group—men technically British subjects who have lived so long in Germany that they have become habituated to German tastes and sentiments. These men receive limited food supplies from German sources outside the camp. (*b*) A Jewish group which receives no supply from outside the camp. (*c*) A group which, for one reason or another, receives no supply from outside the camp; this group probably includes several hundred. (*d*) A group—far the largest—which receives a number of packages from relief societies, trades unions, etc., in Great Britain. (*e*) Men who receive supplies from their own families and friends in Great Britain. There is a relief fund in the camp available for those who choose to apply—the relief being regarded as a loan to be repaid at some future time. There are men who voluntarily subsist upon camp rations alone, and will not be beholden to, or ask for, aid.

The diet of the camp is fashioned after the monthly "Speiseplan" supplied by the authorities, and based upon the dietetic standards of Professor Backhaus. It provides for 80 to 85 grams of protein, containing the necessary amino-acids—30 grams of fat and 500 grams of carbohydrates—corresponding to about 2,700 calories.

The diet is arranged to include the minimal amount of fat, a sufficiency of protein, the necessary salts, vitamines, and enough raw or fresh-cooked food to maintain the health of a non-working man. Dr. Taylor observes that the men who took the camp ration actually got 99 grams protein, 25 grams fat, 525 grams carbohydrate, corresponding to 2,740 calories.

"It is clear that for the men who took the ration it was quantitatively adequate, except for the difference in fat, even if the men who took the ration had subsisted entirely upon it," and two-thirds of them did not.

If the whole 3,700 in the camp had lined up for the ration it would not have gone round, but Dr. Taylor is convinced that the food sent in from outside was equal to one-half to two-thirds of that supplied by the camp authorities. The men engaged in the kitchens had to prevent waste and estimate as near as they could the amount of camp rations which would be called for. On two days the supply of fresh fish gave out with 100, and with 250 men still in line. These were provided with tinned herrings. Five out of seventeen of these tins which Dr. Taylor saw opened were putrid, and many of the men naturally refused this food. Dr. Taylor writes:

> I was not able to observe that the nutrition of the men who subsisted largely or entirely upon the camp ration was any lower than that of the men who subsisted partly or entirely upon supplies sent from abroad.
>
> With one exception (the tinned herring), the different foodstuffs have been found to be of satisfactory quality. . . .
>
> The cheese and cocoa were not of high grade, but were unspoiled. The margarine was not a high-grade product, but was sweet. Fresh fish was served during three days of this survey, and was of excellent quality. The potatoes were of good grade. The bread corresponded in quality, texture, and appearance with the black bread served in the ordinary beer restaurant in Berlin. The Englishman dislikes this bread and, practically speaking, eats none of it.

The evidence of Dr. Taylor, then, is conclusive as to the physiological adequacy of the ration given out to those who chose to take it.

The British object to the German cooking as displayed under the exigencies of camp life. On this head Dr. Taylor makes the following statement:

> It is clear, from conversations with even the most violently protesting prisoners, that their objections do not apply materially to the foodstuffs, and do not mean to imply that the food as cooked is unfitted for human consumption. They simply mean that it is so different from the food to which they are accustomed that they cannot learn to regard it with anything else than distaste.
>
> Replies to widespread questioning of men in normal flesh indicated that loss of weight had not been frequently observed; indeed, some men had gained in weight. On the other hand, many prisoners who were obese had lost weight, and the diet is obviously not calculated to produce obesity.
>
> The supplies received from abroad consist of 800 kg. [1,760 lb.] of bread daily, and varying amounts of butter or margarine, tinned British army ration, corned beef, sugar, cakes, biscuits, tea, jam, honey, bacon, and various titbits.

The camp ration is particularly deficient in fat, and inquiry has led Dr. Taylor to the conclusion that the supplies from abroad of cakes, sweets, and tit-bits are disproportionately large, and of fats surprisingly small. Some men receive far more than they can consume, others a moderate supply, several hundred none or next to none. Some are generous, but many do not believe it proper to receive food from their fellow prisoners.

> It is clear that there is in Great Britain a complete, and from the standpoint of the prisoners in Ruhleben most lamentable, lack of organization in the selection of foodstuffs and distribution of food packages for these prisoners. It is again the old story of unorganized charity being qualitatively inefficient and quantitatively wasteful.

Dr. Taylor points out that, from a nutritional point of view, the two sources of food supply, from Germany and from Great Britain, should complement each other so as to secure a satisfactory ration. The sending of supplies from Great Britain should be organized and controlled, and the German authorities should cease to attempt to furnish a balanced ration with the money it was decided to apply for the purpose, devoting their outlay entirely to certain articles of food. The following general arrangement in diet is proposed—the figures have been prepared for 3,500 men:

> *Suggested outlay from the German side per man per day:* Three days a week, 125 grams fresh meat; two days a week, 200 grams fresh fish; one day a week, 150 grams tinned corned beef; one day a week, 150 grams smoked fish. Each day in the week 1 kilo potatoes and 300 grams of a root or leaf vegetable.
>
> *Suggested outlay from the British side per man per day:* Each day in the week, 400 grams white bread, 30 grams butter or margarine, 50 grams bacon, 50 grams sugar, 30 grams jam or conserves, 30 grams Quaker oats, and 30 grams condensed milk; tea and coffee as needed.

Such a diet, says Dr. Taylor, would contain 80 to 90 grams of protein, about 65 grams of fat, and 425 grams of carbohydrate, and would yield about 2,600 calories. It would contain the desirable amount of fat, it would conform to the tastes of the prisoners, and it would provide the interned men with certain desired articles which the German authorities do not supply.

In acknowledging the report Sir Edward Grey "fears that the circumstances will not permit of the adoption in practice of the recommendations made by Dr. Taylor in regard to the establishment of an organization controlling the supply of food parcels sent to the camp from this country." He promises, however, to communicate the report to the Prisoners of War Help Committee with the request that it be made known as widely as possible among the various societies and individuals by whom such parcels are now being sent to Ruhleben.

It is certainly a task which such societies should take up, for it will be a disgrace to this country if the defects in organization pointed out by Dr. Taylor are not remedied.

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A PAMPHLET entitled, *An Every Day Directory for War Time*, has been compiled and published (price 6d., post free 9d.) by the Women's Imperial Health Association, 7, Hanover Square, and the Women's Emergency Corps, 15, York Place, Baker Street, W. It includes women's work, but does not exclude other organizations.

British Medical Journal.

SATURDAY, JUNE 17TH, 1916.

## RECIPROCAL DUTIES OF STATE AND PROFESSION.

THE General Medical Council at its recent session passed two resolutions which will undoubtedly prove to be of serious importance to the medical profession. The two have a certain relation to each other, for both are concerned with the relation of members of the medical profession to the State.

The first resolution[1] seemed to follow naturally on a series of disciplinary cases in which medical practitioners were charged with covering midwifery practice by uncertified women. The President was asked to draw up a warning notice in consultation with the legal advisers of the Council. It will not be difficult to draw up such a warning notice if it is to be only a general threat of penalties for the covering of uncertified women, but if it is to contain any instruction as to the limitations of what is meant by "covering," it will have to be most carefully framed to avoid injustice, not only to practitioners, but to the public. With the Midwives Act as it stands, the dividing line between "covering" which deserves punishment, and a proper and sympathetic service to the poorer classes of parturient women is not always easy to draw, and unless the term "covering" is very strictly defined, there will be great danger that fear of transgressing may impel many practitioners to refuse to go to any case of confinement which is being attended by an uncertified woman. The ideal put forward by Dr. Newsholme, that there should be a proper supply of certified midwives in every area, and that county councils or town councils should co-operate with the State, each paying half the fee of a certified midwife when the mother cannot afford it, is a long way from being realized either in country or town areas generally; a large percentage of mothers are still unfortunately being attended by handy women, either on the ground of expense or because there is no certified midwife in the district. If in one or other of these circumstances a doctor is called in because some difficulty occurs, what is his duty? It would not be in the public interest to make a rule which would deter doctors from attending in such cases. That is not the way to bring pressure to bear on public authorities in town or country. For a doctor habitually to "follow" (to use the popular term) an uncertified woman whom he knows to attend confinements "habitually and for gain," would, as a rule, rightly come under the term "covering," and it is a matter for regret that there should be thought to be any need for a warning notice to this effect; but will a doctor be running any risk of disciplinary measures if without any previous arrangement he responds to the call of such a woman, or will he be expected to act as a public detective and report such cases to the authorities at the risk of a charge of "covering" if he failed to report them? It is no use burking the fact that, rather than run such risk or incur the odium of reporting a patient for employing an uncertified woman (for that is certainly how the patients will regard any such detective work), many doctors will prefer to be otherwise engaged and unable to attend any case for which they have not been previously engaged or to which they do not receive a call for aid on the official form from a certified midwife. The mere mention of this, among many other difficulties that arise every day in general practice in connexion with similar cases, makes it imperative that any warning notice should be not merely one more of those threats of pains and penalties with which the profession is so freely bombarded to-day, but that it should be educative and fully explanatory; while protecting the mothers as well as the midwives so far as possible from unqualified women, it should not place medical practitioners in a position of doubt and difficulty. The fairness and efficacy of any warning notice on the subject will depend entirely on the way in which it is drawn up and the information it gives, and we repeat that the task committed to the President and legal advisers of the Council is by no means easy, and we feel sure that the result will be very carefully scrutinized by the Council when the draft comes before it.

The second resolution of the General Medical Council[2] to which we refer is in the nature of a recommendation that "instruction should be given, in the courses of forensic medicine and public health, or otherwise, on the duties which devolve upon practitioners in their relationship to the State and upon the generally recognized rules of medical ethics." To carry out part of this resolution ought to offer no insuperable difficulty to the colleges and medical schools. Some instruction is already given, though perhaps not so fully as it ought to be. Instruction in the duties of practitioners in regard to coroners' cases and the giving of evidence in either civil or criminal courts ought undoubtedly to receive more attention than is generally given to it. The duties of the prompt notification of infectious diseases, including tuberculosis; the duty, so far as it falls on medical practitioners, of notifying births; the law as to death certificates, certificates in lunacy, and so on, afford material for lectures to students which is not difficult to handle. When we come to what may be called more specialized obligations, difficulties will arise which will compel lecturers to confine themselves within narrow limits. For example, the duties of medical officers of health, Poor Law medical officers and public vaccinators, school medical officers, and many other public medical officials, could not be treated in anything but a very summary way in a general course.

But the hard experience of the profession in recent years compels the suggestion that the rights of practitioners as well as their duties are subjects on which students should be instructed. The resolution speaks only of the duties of practitioners, but the systematic and often crude attempts of many public officials, especially of too many coroners, to require, with a show of authority and without a fee, services which practitioners are in no way legally bound to render, make it important that if legal duties are to be explained, legal rights ought equally to be described.

Again, the working of the Insurance Acts offers a wide field for instruction, since the duties and rights of practitioners in relation to the State in this respect are often matters of great importance; yet it is more than doubtful whether any course of lectures to students could satisfactorily cover even a fraction of this field. In the first place, ordinary university professors probably know nothing of these matters

[1] SUPPLEMENT, June 1st, p. 128.

[2] SUPPLEMENT, this week, p. 145.

worth lecturing about beyond the vaguest generalities, and the complexion placed on these would depend far too much on the personal feelings of the lecturers in favour of or against panel practice.

The second part of the resolution—that referring to instruction in medical ethics—will also present difficulty in application. A distinction must, of course, be drawn between the "ethical rules" of the British Medical Association and "generally recognized rules of medical ethics." The "ethical rules" are, of course, really rules of procedure in determining cases where ethical conduct is involved, and in most cases the question is one of obedience to or neglect of decisions of the Representative Meeting or the local Division. For example, the numerous decisions of the British Medical Association adopted by Divisions with regard to minimum salaries or fees that should be accepted are regarded as of such importance that in not a few cases non-compliance has led to expulsion from the Association on the ground of conduct "detrimental to the honour and the interests of the profession." Loyal members of the Association have often longed for some means of enforcing its rules of conduct on the attention of medical students, but can it be claimed that the decisions of the Association on such matters come within the range of instruction contemplated by the General Medical Council? On the other hand, if this cannot be claimed, what is left to the lecturer on medical ethics? The British Medical Association has from time to time covered by its pronouncements practically the whole field of medical ethics, but who is now to determine which of its pronouncements are "generally recognized"? Is this to be left to each university lecturer, or does the General Medical Council now intend to proceed to draw up a sort of code of honour binding on all medical men, failure to comply with which may involve removal from the *Register*, or some lesser penalty which the Council may obtain power to inflict? Something of the sort might be of great advantage to the profession, and the task of the General Medical Council would be greatly lightened by the accumulated experience and help of the British Medical Association, but in the meantime lectures to students on the generally recognized rules of medical ethics can cover little ground. Such things as undercutting one's neighbours, ingratiating oneself with patients first seen in consultation with a colleague with a view to attract them from him, the innumerable ways of touting for patients short of open advertising, and other matters of the kind, could of course be referred to in lectures to students, but all such references could only be in the most general terms.

## ENROLMENT A DUTY FOR MEN BETWEEN 41 AND 45.

THE memorandum issued by the War Office to all medical men who may be under the age of 45, and the covering letter from Sir Alfred Keogh, which we publish in this week's SUPPLEMENT, p. 141, will bring home once more to the minds of all medical men the importance of proper organization of our profession in the national crisis.

We dealt last week with the position of medical men under 41, who now come under the provisions of the Military Service Acts; and we pointed out how essential it is to their own interests, no less than to the interest of the country, that every one of them should be enrolled before June 24th. This week it is our duty to call attention to the later part of Sir Alfred Keogh's letter, wherein the Director-General appeals to men between the ages of 41 and 45.

The provisions of the Military Service Acts limit compulsion to those single men who had not reached their 41st birthday on March 2nd last, and to those married men whose 41st birthday is later than June 24th. But the difficulty of supplying the medical needs of the navy and army from men below this age, with due consideration to the maintenance of proper and sufficient treatment for the civilian community, led long ago to the raising of the age up to which medical men are eligible for service at home or abroad. Any medical man whose age does not exceed 45 next birthday, and who is physically fit and acceptable to the military authorities, may apply for a commission in the R.A.M.C. Not all the medical men under 45 are wanted for the army, nor could all be spared without serious dislocation of the medical requirements of the civilian population. How, then, can selection be made? So long as compulsion is not applied to men between the ages of 41 and 45, there are only two methods by which voluntary assistance can be obtained from them: First, the military needs may be made known by advertising them, when such men as are moved by the spirit of patriotism may offer their services. The objections to this method are that no individual can possibly know in what direction his services are most needed. In his desire to serve his country by taking a commission he may be putting the area in which he practises to serious inconvenience. Moreover, at what he believes to be the call of duty, he may be inflicting great hardship upon himself and his dependants—hardship which might have been avoided by a process of judicious selection by some one in a position to know all the requirements and difficulties of the case. The second method is to introduce an intermediate body possessing knowledge both of the military requirements and of the civilian and individual difficulties. Such bodies are the Central Medical War Committee and the Scottish Medical Service Emergency Committee. These Committees are able to view the situation in its proper proportions owing, on the one hand, to their close relations with the medical military authorities, and on the other hand to their sympathetic understanding of the position of the medical profession and of the civilian community.

The scheme of enrolment is accepted by Sir Alfred Keogh as by far the best and fairest method for obtaining medical officers for the army. In his letter the Director-General says: "Practitioners between 41 and 45 years of age are in fact in a position, by now enrolling, to assist in a peculiarly important degree the achievement of the objects of this scheme for the organization of the profession, thus enabling the Government both to meet the pressing needs of the forces at home and abroad, and to ensure the maintenance of an adequate medical service for the civil population."

The scheme completely loses the spirit of fairness unless the majority of men agree to accept it and the obligations it involves. It is inconceivable that any medical man exists in this country who does not wish to serve at the present time wherever he is most needed. It is certain that every man is anxious to make whatever sacrifices are demanded of him. Is it possible that any man will continue to hang back, will refuse to take his part in a scheme of organization approved by the Government, supported by the strong appeal of the Director-General, designed and carried out by committees which have the assistance of the heads of the profession; a scheme which satisfies the instincts of patriotism and equity?

He must be a bold man who sets his private judgement against a proposition supported by such weight of opinion as is found to support the scheme of enrolment.

We trust, therefore, that the appeal of Sir Alfred Keogh to the medical profession may meet with immediate response, and that within a very short space of time there will not be a man left who is under 45 years of age who will not be enrolled with one of the committees responsible for organizing the medical services of the country in time of war.

## COMMISSIONS FOR MEN BETWEEN 45 AND 55.

WE are authorized to state that the War Office has decided to give commissions in the R.A.M.C. to medical men between 45 and 55 willing to undertake whole-time general service in the United Kingdom. The announcement will, we believe, be received with satisfaction by a considerable number of medical men between the ages mentioned, who are anxious to serve the country, but have hitherto been debarred from doing so on the score of age. This step has been taken owing to the growing demands upon the Army Medical Service—demands which, we believe, are particularly urgent at the present time. Every man who thus offers himself for whole-time general service in the United Kingdom will set free one younger medical officer now employed in this country to serve with the armies which the country has in France, in the Mediterranean, in Mesopotamia, in India, and in Africa.

Information supplied to the Central Medical War Committee at its meeting on June 14th makes two points clear. The first is that there is an urgent necessity for more medical men to meet the demands of the new units of the new armies, and to make good the wastage which must continually go on in all the many and various fields in which the British armies are operating. The second point is that the War Office seems to be doing all that is possible to meet the demand by calling on all young men who pass qualifying examinations to join the R.A.M.C. at once, and by making an appeal to young graduates in the Overseas Dominions. All these are eligible to receive commissions in the R.A.M.C. for general service abroad. The War Office is considering how far it may be possible to employ senior medical students as residents in hospitals, and other methods of dealing with hospital work are being developed.

A medical man who has not previously engaged in any form of military service must undergo a period of training in his special duties in this country; this period has been reduced to the lowest possible limit. There are, however, as has been said, a considerable number of medical officers in the Territorial Force who had undergone training before the war and have since gained much practical experience. It is such men that the War Office would prefer to send abroad in considerable numbers, and it is the places of such men with the forces at home that can be filled by men between the ages of 45 and 55. We understand that a certain number of medical men between these ages have volunteered to serve abroad and are being employed in the Mediterranean.

The decision of the War Office affords a great opportunity to medical men between 45 and 55 who can see their way to get free from their present civil obligations and accept commissions in the R.A.M.C. with the home armies. It must, however, be understood that the offer applies only to men who will undertake to give whole-time service and to go to any place in the United Kingdom to which they may be sent.

## RECOGNITION OF PROFESSIONAL COMMITTEES UNDER THE MILITARY SERVICE ACT.

THE Central Medical War Committee for England and Wales and the Scottish Medical Service Emergency Committee have been recognized by the Army Council as the Central Professional Committees for England and Wales and Scotland respectively, under the regulations made by the Order in Council in compliance with the provisions of the Military Service Act, 1916 (Session 2). The Reference Committee appointed by the Royal College of Physicians of London and the Royal College of Surgeons of England has also been approved by the Army Council under paragraph 5 (1) of the regulations.[1] Communications from practitioners in England and Wales should be addressed to the Secretary, Central Medical War Committee, 429, Strand, London, W.C., and from practitioners in Scotland to the Secretary of the Scottish Medical Service Emergency Committee, Royal College of Physicians of Edinburgh. The Secretary of the Committee of Reference is Mr. F. G. Hallett, the Conjoint Board in England, Queen Square, Bloomsbury, W.C.

## THE BATTLE OF THE CLUBS IN NEW ZEALAND.

WE desire to call attention to a notice which appears on page 38 of the advertisement columns with reference to friendly society lodge appointments at Wellington, New Zealand. For some time the relations between the lodge doctors and the friendly societies throughout Australasia have been very unsatisfactory, and though in New South Wales the doctors have been able to some extent to better their position, in New Zealand they have met with little success. At present Wellington is the centre of dispute, and the New Zealand Branch of the British Medical Association appeals for the loyal co-operation of all doctors in the mother country. Briefly the facts seem to be as follows: For some years past the lodge doctors have received 15s. per member a year; for this they had to give medical and surgical attendance to the member, his wife, all male children up to 16 years of age and female children to 18 years, as well as the widowed mothers of single members. Operations, confinements, and anaesthetics were not included, and there was a distance limit of three miles. At the conference at Auckland in 1914 it was decided to give notice to the lodges to bring into force a new standard agreement at the beginning of 1915, but the outbreak of the war prevented this being carried out. As a large number of doctors joined the forces, not only did the work of those remaining increase, but, with greatly increased expenses, the position became practically unbearable, and the lodge doctors, after notifying the Wellington Division of the British Medical Association, approached the lodges for better terms. The sum of 24s. a year was demanded, and the doctors handed in their resignations to take effect at the end of 1915, the requisite notice being given in each case. A minority of the lodges adopted the new terms at once, except that the doctors agreed to accept 21s. provisionally until the end of the war. The majority of the lodges, however, refused to agree to any increase over the 15s., and they immediately issued circulars seeking applicants on the lodge terms for the appointments. The Wellington Division then took the matter up vigorously, and the resignations of the doctors took effect, the lodge members only being treated as private patients; for this the lodges had to pay. In this predicament the lodges approached the Minister of Public Health (the Hon. G. W. Russell), who, after hearing the friendly societies, asked for a deputation of medical men. Accordingly, on April 11th, members of the Wellington Branch formed a deputation

[1] SUPPLEMENT, June 10th, p. 134.

to the Minister and presented a memorandum on behalf of the lodge doctors. It was made clear that, though the doctors would be willing to treat the families of lodge members absent at the war at the old rate of 15s., the full rate required for members and families would be 24s., a reduced rate of 21s. being accepted in some cases until the end of the war only. Statistics obtained by the Wellington Division showed that on an average each family consisted of four persons, and the memorandum pointed out that in Great Britain under the Insurance Act each individual insured person paid 7s. for himself alone, as compared with the 15s. paid for four persons in New Zealand. The Minister of Public Health thought that a rise from 15s. to 24s. was large, and that the present was not the time to ask for increases. The deputation pointed out that though there was a rise in the cost of living, unemployment was never less in evidence, and the working man was better off now than ever. The 15s. rate worked out at only 10½d. per attendance on the average, and in some cases as low as 3d. to 5d. The Minister asked that he should be allowed to call a conference of the lodges and the doctors; he was prepared to admit that 15s. was too low, but he was also prepared to admit that 24s. was too high. His position placed on him the necessity to find medical service for every part of the country, and if a large body of persons were unable to get medical attendance at a price they could afford, he would have to find some method to supply the need. The suggested conference has since been held, but no agreement was arrived at. Some of the lodges appear to have boasted that they would be able to get any number of medical men from Great Britain or America to accept their terms, and the New Zealand Branch now confidently appeals to all medical practitioners to assist in its fight for reasonable terms. The societies are evidently ready to take advantage of the ignorance as to the real state of affairs of doctors in the mother country who might think to better themselves by going to New Zealand, but there can be no excuse for any such ignorance, and the real position will be fully explained to any doctor who desires full information, if he will apply to Dr. H. G. Gibbs, Honorary Secretary New Zealand Branch, 123, Willis Street, Wellington, New Zealand, or to the Medical Secretary, British Medical Association, 429, Strand, London.

## FEVER WITH MENINGISMUS.

In the *Muenchener medizinische Wochenschrift* for May 9th, 1916, Dr. Richard Stephan, of Leipzig, describes an outbreak of febrile illness associated with meningismus which occurred during the summer and autumn of 1915. The first cases were observed during May. The illness was ushered in by rigor with pyrexia, headache, and marked hypersensitiveness to either active or passive movements. The mucous membrane of the tonsils and pharynx was red and swollen, and from the third to the sixth day catarrhal bronchitis frequently supervened. Stiffness of the neck muscles and bradycardia were also observed. Diarrhoea occurred in some cases, and acute dilatation of the heart was also met with. Some of the cases exhibited herpes labialis. A point of particular interest is that several developed haemorrhagic nephritis. In spite of the gravity of some of these symptoms the prognosis proved to be good. On lumbar puncture the cerebro-spinal fluid was found to be clear and showed no increase in its albumin content. The centrifugalized deposit yielded few cells of any kind, those present consisting of lymphocytes and polymorphonuclear leucocytes. Gram-negative cocci were seen in the latter. This clear cerebro-spinal fluid on incubation yielded in every case after enrichment of the fluid by Kutscher's method, and in half of the cases without such enrichment, a Gram-negative diplococcus which was distinguished from the meningococcus by its profuse growth on agar, and also by agglutination tests; but this matter is to be more fully dealt with by Drs. A. Harzer and C. Lange in a future communication. From the nasopharyngeal secretion of the cases the meningococcus could not be isolated. Blood cultures gave a negative result. In two of the cases that developed haemorrhagic nephritis Gram-negative diplococci were observed in the centrifugalized deposit of the urine. Investigation as to the occurrence of the diplococcus isolated from these cases in the upper respiratory passages of normal persons, and of persons suffering from other diseases, has had to be deferred until its serological characters have been defined more fully. As regards treatment, Stephan states that good results followed the administration of hexamine (urotropin), which was given without harm to cases after the development of haemorrhagic nephritis. The dose was 0.5 gram of hexamine six times a day. As has been mentioned, prognosis was good, recovery taking place as a rule in eight to ten days. No mention is made of any case having died. The malady may be described as an acute febrile illness with meningismus. Stephan regards the condition as due primarily to a bacteriaemia, the upper respiratory tract or the lung being the portal of entry. As to whether this acute meningismus is a new disease, hitherto unknown, or not, Stephan is uncertain; but he believes that in all probability a great number of cases of so called febris ephemera, febris herpetica, or febris cryptogenica belong to this group. In any case he is convinced that the disease is distinct from cerebro-spinal fever. In view of the study which is being made in this country at the present time of Gram-negative cocci in connexion with outbreaks of cerebro-spinal fever, no little interest attaches to Stephan's communication.

## WEIL'S DISEASE.

In 1886 Weil described a type of epidemic jaundice that has since gone by his name; its etiology has till quite recently been obscure. A similar, if not identical, disease appears to exist in Japan, and here it is caused by infection with a particular spirochaete, as was described in the BRITISH MEDICAL JOURNAL of April 1st on page 491. Advices from Germany report[1] that in that country also a spirochaete has been isolated from the blood of patients with acute infectious jaundice by Hübener and Reuter, and by Uhlenhuth and Fromme. This organism can be cultivated from the circulating blood only during the first few days of the fever; in a case reported by G. Herxheimer[2] ending with a fatal result due to the occurrence of bronchopneumonia, the spirochaetes could be demonstrated in the patient's tissues by Levaditi's method of staining with silver. The liver and kidney were the organs mainly involved, and the latter was found to contain many more of the spirochaetes than the former. The spleen, curiously enough, showed no enlargement, and was practically normal. Herxheimer points out that several recent writers besides himself have failed to confirm Weil's original statement that the spleen is enlarged in this form of epidemic jaundice. Two cases of the disease are reported by Krumbein and Frieling;[3] here the source of the infection was a dog acutely ill with jaundice that lasted about four weeks. The infection in one case may have taken place by means of a scratch on the hand inflicted by one of the dog's teeth in the process of washing out the animal's mouth with hydrogen peroxide on the second day of its illness. Both patients—the dog's owner and a medical man—were daily in close contact with the animal, and may have become infected by flea-bites; both had attacks of acute febrile jaundice, and both recovered. The incubation period of the disease could not be determined with any certainty in these two instances, but Krumbein and Frieling argue that it was probably nineteen days in the case of the owner whose hand was scratched, and twenty-two days in the other case.

[1] *Deut. med. Woch.*, Berlin, 1915, No. 43.
[2] *Berl. klin. Woch.*, 1916, No. 19.
[3] *Deut. med. Woch.*, Berlin, 1916, No. 19.

## MEDICINE IN THE ENCYCLOPAEDIA OF RELIGION AND ETHICS.

IT is with a mixture of wonderment and respectful admiration that the eighth volume of Dr. Hastings's great *Encyclopaedia of Religion and Ethics*[1] must be welcomed in these days when nearly the whole world is at war, and when publishers and editors in particular are hard put to it to go on. Still this volume is only a little behindhand, for although its title page bears 1915 the volume itself has just been issued. It contains 910 pages of double columns and not less than 1,200 words on each; its writers, of many nations and races (including German professors), number 185; and its articles more than 260—it is an achievement. The first article, on "Life and death," by Professor J. A. Thomson of Aberdeen, deals, of course, with many medical matters; and those which follow it, and which look at the subject from Primitive, American, Babylonian, Buddhist, Celtic, Chinese, Christian, Egyptian, and many other standpoints, contain not a little which is of intense interest to the thoughtful physicians who "beside the unveiled mysteries of life and death go stand." Another group of articles, occupying about fifty pages, discusses marriage in all its relations, including the medical, and among all races. It is a storehouse of most interesting information such as could not easily be gathered from any other single source. Milk (bathing in it as well as drinking it) is another article of interest for the curious. Madura is described, and its wondrous shrine, but not (indeed, one could hardly expect it) its "foot"; lycanthropy is entertainingly expiscated; the Melanesians and Malayans have all their inmost secrets laid bare; melancholy is intimately inquired into, its medical aspects set forth, and dear old Robert Burton, "by profession a divine, by inclination a physician," is referred to; magic is brought very near to ancient medicine; mana, which seems to be, like taboo, a word which can mean almost anything and nearly everything, gets full consideration; and therapeutic effects of the wonderful Midsummer-day fires of Morocco are not forgotten. Monsters are investigated from a biological standpoint by Dr. W. L. H. Duckworth of Cambridge, and from an ethnic one by J. A. MacCulloch (who also writes on metamorphosis, miracles, and mouth), but the ethics of what is to be done with them in relation to social status, marriage, legal position, and the like is prominent by its absence; indeed, the page and three-quarters given to this subject is meagre in the extreme. Another criticism arises in connexion with the articles on missions, which occupy fifty-one pages, but through which one has to search with microscopic minuteness in order to discover (on p. 740) a reference to medical missions. These, however, are trifling faults to find in the midst of so much which is magnificent, massive, and mature.

[1] *Encyclopaedia of Religion and Ethics.* Edited by James Hastings, with the assistance of John A. Selbie, M.A., D.D., and Louis H. Gray, M.A., Ph.D. Vol. viii. Life and Death—Mulla. Pp. xx, 910. Edinburgh: T. and T. Clark. 1915.

## RURAL SANITATION.

A CORRESPONDENT suggests that it would serve the turn of local authorities to send their medical officers of health for a tour of instruction in the parts of France at present guarded by the British armies. If the chairmen of the public health committees were to go also it might be still better. Starting from conditions worse than we are accustomed to put up with in this country, the Army Medical Service has brought about a state of things in the small towns and villages within the British military zone a great deal better than anything known in similar places at home. The transformation is due partly to zeal and knowledge, partly to the possession of authority and the command of adequate labour, and partly to liberal expenditure. It is the old story of the trained practical expert in command possessed of adequate means and unhampered by amateurs who may be excellent tinkers, tailors, or cabinet-makers, but are wholly ignorant of sanitary administration or the scientific principles on which it rests. Lieutenant-Colonel Herbert Jones, who has had a long experience of public health administration in civil life, said at the conference at the Royal Sanitary Institute last week that he had been astonished at the rapidity with which sanitary improvements could be carried out in the army at home. To see the work on a large scale it would, we believe, be necessary to visit France.

## NAPOLEON AND TISSOT.

DISCUSSIONS on the real and supposed diseases of Napoleon already make a considerable body of literature, and there is no sign that interest in the subject is dying out. The latest new document we have seen is published in *Paris Médical* of May 13th. It is a letter written to Tissot, the famous physician of Lausanne, and is to the following effect: "Sir,—Without having the honour of your acquaintance, having no other right than the esteem with which your writings have inspired me, I venture to importune you with a request for your advice on behalf of one of my uncles who suffers from gout. Humanity, Sir, bids me hope that you will deign to reply to this request for a consultation so ill expressed. I myself for a month past have been troubled by a tertian fever, which makes me doubt whether you will be able to read this scrawl. I conclude, Sir, with an expression of the perfect esteem with which the reading of your works has inspired me, and the sincere gratitude which I owe you. I am, Sir, with the most profound respect, etc." Tissot did not think the letter worth answering, and, indeed, as a statement of a case it is pitifully vague, and as a literary composition it is poor and feeble, very different from the lightning strokes of the Napoleonic pen. This may, perhaps, be explained by the illness of the writer. At any rate, Tissot endorsed the letter "Not interesting." He was no prophet, or the signature, "Buonaparte, artillery officer in the regiment of La Fère," would certainly have aroused his interest. Perhaps the poor lieutenant had forgotten to send a fee. Tissot wrote much and on the most various subjects—inoculation, bilious fever, the health of literary men, epilepsy, diseases of the nerves, and onanism; the last of these books made his name known throughout the world. Probably the works which gained for him the admiration of the future emperor were his popular treatises on health, which went through countless editions and were translated into most European languages, and his essay on the health of men and women of the world.

## LOCALIZATION OF BULLETS.

A REPORT of a demonstration of a new $x$-ray apparatus by Hasselwander of Munich for the correct stereoscopic showing of bullets, etc., was published in *Electrical Engineering* for May 11th. In this method a land surveying instrument called the stereoplanigraph is used, and the idea appears to be to reproduce by means of this instrument and the stereoscopic image an automatic modelling in all three dimensions of space of the radiograph. It is claimed that this method is very exact; that it has been used in 100 cases with complete success; and that it gives a permanent record of each case. It seems to be a distinct advance in the methods of stereoscopic radiography, but it is not clear from the description that, from the practical point of view—namely, the exact localizing of a foreign body for the purposes of surgery—it equals in exactitude and ease of application the cross-thread method devised by Mackenzie Davidson.

THE King has appointed Mr. John B. Story, M.B., F.R.C.S.I., Professor of Ophthalmology and Aural Surgery in the Royal College of Surgeons of Ireland, to be Honorary Surgeon-Oculist to His Majesty in Ireland, in the room of the late Dr. Charles Edward Fitzgerald.

# THE WAR.

## ABDOMINAL INJURIES.

*(From a Correspondent in Northern France.)*

ALL along the British front cases of gunshot wound of the abdomen are the subject of special arrangements. These are not invariably identical and nowhere are they regarded as unalterable should the needs of the moment seem to dictate their modification. Everywhere, however, the same underlying principles prevail.

Whatever be the ordinary rules of the area for dealing with casualties, they are held to apply to no case which there is reason to regard as one of penetrating wound of the abdomen. Unless any such case obviously will not bear transportation, it is to be sent without delay to the nearest medical unit at which it can be detained and suitably treated for any desired length of time.

The official status of the unit to which the case is sent may vary, but it will always be one possessed of an operating-room kept ready for instant use; of a personnel which includes women nurses and at least one surgeon versed in abdominal surgery; and of a ward equipped on the lines of an ordinary hospital and so disposed that its current work and occupants need not be disturbed if occasion require that the rest of the establishment be evacuated or moved elsewhere at short notice.

Units which meet these desiderata are to be found all along the line. As a rule, they are casualty clearing stations, but occasionally they are or have been "tent sections" of field ambulances which have budded off the original unit and almost lost any connexion therewith. Their distance from the trenches varies, but is never so great that it could not easily be traversed by a motor ambulance within an hour and often in half that time.

It would be wrong, however, to conclude that not more than about sixty minutes will commonly elapse between the receipt of an abdominal wound by a soldier and his appearance as a patient in an operating theatre. There have been instances in which this has occurred, but as a rule it is not to be expected. The determining factors are numerous, and the precise distance between the spot at which a man is wounded and the unit at which he is to be treated is about the least influential of all of them. The difference that it can make is a matter merely of minutes, that caused by the rest may be one of hours.

Among the more important factors are the following: (*a*) The occupation of the patient at the time he is hit; (*b*) the hour of the day; (*c*) the state of the weather; (*d*) the extent and character of the fighting at the time in progress; (*e*) the character of the communications between the fire trenches and the regimental aid post and between the latter and the advanced dressing stations; (*f*) the extent to which the roads immediately behind the fighting line are exposed to artillery or rifle fire.

It is obvious that any of the first three of these factors may vary greatly from day to day, while in regard to the three latter it may be said that hardly two consecutive miles of trenches seem to present quite the same problem from the point of view of evacuation of casualties.

As for the effect of occupation, a man may be struck when (1) in a fighting or communication trench, or (2) when out in front of the trenches as a member of a wire-repairing or other working party; or (3) when engaged in an active attack on the enemy; or (4) while going up to or back from the trenches by an above-ground route.

In case (1) he is likely to receive immediate attention, though whether he will be removed to the rear forthwith is quite another question. In cases (2) and (3) it may sometimes be impossible to get him brought in for a very long time. In case (4) he might not be found for an indefinite period. There are plenty of places where the ground behind the lines is either woody or obscured by hedges and bushes.

As for the other factors it may be impossible to spare men to take an abdominal case to the rear if active fighting is in progress, or heavy rain may render a communication trench temporarily impassable; or the enemy may take it into his head to pepper with shells a road along which the patient and his bearers will have to pass when they have left the trenches behind them, and such "strafing" may be kept up for hours.

Other considerations are the following: Some lines of trenches, either because the ground is flat or the enemy occupies a slight elevation, can neither be entered nor left except under cover of darkness. Other trenches, either because the ground behind them lies low or is covered by trees, can be entered in daytime and by an above ground route without material risk unless the enemy happens to be shelling what is usually "dead ground."

The character of the communication trenches is also a factor of importance; they may, for instance, be habitually flooded except in the driest weather because the German trenches lie sufficiently high and sufficiently near to allow them to pump down on the British trenches as much water as they please.

At other places the trenches may at all times offer an easy route for evacuation of casualties, but are so long, say upwards of two miles, that the journey of a patient down them necessarily absorbs considerable time.

Finally, there are spots where it is comparatively easy to get the patients from the fire trenches to the advanced dressing station, but not any further, with promptitude because there is no place near the advanced dressing station at which it is possible to keep an ambulance waiting, and consequently it has to be fetched.

The writer is personally acquainted with places which exemplify each of these statements, and the general list of determining factors could doubtless be extended. The net result is that already indicated—namely, that the time elapsing between the moment that a patient is hit and that of his arrival at the hospital where he is to be treated is liable to great variations not only at different parts of the line but at one and the same spot. There was, for example, at work till quite recently an institution which sometimes got its abdominal cases on the operating table within as little as an hour from the time at which they were struck, and sometimes not for a dozen hours. This was despite the fact that it lay within a quarter of an hour's drive of the trenches which it served, and that these could commonly be approached and left in daylight.

The foregoing, though the most important, are not the only circumstances which help to bring about great variation in the lapse of time between the receipt of an abdominal wound and the undertaking of any consequent operation. All abdominal wounds cause more or less shock, and the shock is liable to be increased by many circumstances, including exposure to wet and cold. Some surgeons are disposed to operate as soon as they possibly can, despite the existence of even profound degrees of shock. Others prefer to wait for some time, adopting meanwhile any measures they deem calculated to reinforce the patient's vitality. These always include the changing of wet clothing, keeping the patient in a warm atmosphere, and making him as comfortable as his injuries permit.

Everywhere now opinion seems on the whole to favour habitual operative interference in all cases of abdominal wounds. It is hardly disputable that cases are saved which would certainly have died under the starvation or expectant treatment formerly in favour, but it is by no means certain that the change of practice spells as much real progress and saving of life as might be assumed from some of the accounts that have been published.

Individual attitude towards the work varies greatly. Some of those who have had most experience of it regard it as of a most depressing and disappointing character, while others are buoyantly enthusiastic. The explanation seems to be that the depths of this very special class of surgery have not yet been fully plumbed, with the result that some men are unduly influenced by the endless cases in which a favourable prognosis eventually proves unjustified, while others are too ready to generalize from the apparently hopeless cases which proceed to convalescence without a check.

The stretcher used for the transport of abdominal cases whenever possible has a back support and a thigh support, relaxation of the recti and other abdominal muscles being thus secured.

## CASUALTIES IN THE MEDICAL SERVICES.

### ROYAL NAVY.

*Killed.*

THE cruiser H.M.S. *Hampshire*, which was carrying Lord Kitchener and his staff on a mission to Russia, was blown up by a mine off the west coast of the Orkneys on the evening of June 5th, and sank with all but twelve of her complement of some 650 men. Among thirty eight officers who perished were three medical officers—Fleet Surgeon P. G. Williams and temporary Surgeons H. F. McNally and H. G. Chaplin.

Fleet Surgeon Penry Garnons Williams was the son of the late Prebendary Garnons Williams, of Abercarnlais, Brecon, was educated at St. Thomas's Hospital, took the diplomas of M.R.C.S. and L.R.C.P.Lond. in 1899, and entered the navy the same year. He was promoted to staff surgeon on May 15th, 1907, and to fleet surgeon last year. Prior to his promotion he was serving on H.M.S. *Amphitrite*.

Temporary Surgeon Hugh Francis McNally was the son of Mr. Nicholas McNally, late Principal of Raglan Street Boys' School, Belfast. He was educated at St. Malachy's College, and served his apprenticeship as a chemist, after which he entered Queen's University, Belfast, where he graduated M.B., B.Ch., and B.A.O. in 1915. He was a member of the University O.T.C., and also of the Irish National Volunteers.

Surgeon Maurice H. de J. Harper, whose death on the *Queen Mary* was briefly noted last week, was 27 years of age, and was the son of a naval chaplain. He received his early education at the Pocklington Grammar School and Trent College, and when at Newcastle-upon-Tyne College of Medicine played cricket for his university and college. After joining the navy he was stationed for many months at Chatham Naval Barracks, was then appointed to H.M.S. *Thames* and about three months ago to H.M.S. *Queen Mary*.

Surgeon T. Mansergh Wood-Robinson, who was killed on the *Black Prince* as noted last week, was also the son of a naval chaplain. He was 25 years old and received his early education at Crediton and Portsmouth grammar schools. After the outbreak of war, while waiting for a commission, he held the appointment of house-surgeon at the Middlesex Hospital. He joined H.M.S. *Black Prince* in May, 1915. A short time ago he was awarded the Royal Humane Society gold medal for a gallant attempt to save the life of a man who had fallen overboard.

*Casualties in the Naval Action of May 31st.*

Since the casualty list was published on June 5th it has been reported that eight officers, mostly from the destroyers *Nomad* and *Nestor*, and about 170 men, were picked up by the Germans, and are prisoners, not killed, as was reported at first. Among the survivors are Surgeon-Probationers D. J. T. Oswald, of the *Nomad*, and A. Joe, of the *Nestor*.

### ARMY.

*Killed in Action.*

Captain Walter Seymour Armstrong, R.A.M.C., of Monatha, Hythe, Kent, was killed in action on May 31st. He was the youngest son of the late Rev. William Armstrong, Vicar of St. Mark's, Dalston, Yorkshire, and was educated at St. George's Hospital, taking the M.R.C.S. and L.R.C.P.Lond. in 1903, after which he acted as assistant medical registrar at St. George's. He subsequently went to Newfoundland, where he was surgeon of St. Anthony's Hospital and surgeon in charge of the Indian Harbour Hospital and a Justice of the Peace. He received a commission as temporary captain in the R.A.M.C. towards the end of 1914, and served with the British Expeditionary Force in France in 1914–15, and subsequently with the Mediterranean Expeditionary Force.

*Died of Wounds.*

Lieutenant-Colonel A. W. Tanner, commanding the 10th Canadian Field Ambulance, died from wounds received on June 3rd. He was born at Watford, Ontario, in December, 1875, graduated at Toronto University in 1899, and settled in practice in Moosomin, Saskatchewan. There he rapidly made his mark as a general practitioner and most capable surgeon. In 1910 he joined the 16th Canadian Light Horse, allied with the 16th (the Queen's) Lancers, and within a month of the beginning of the war was given his lieutenancy in this brigade. From being a combatant officer he transferred to the C.A.M.C., and last year was appointed A.D.M.S. of the 10th Canadian Military District, which included the Provinces of Manitoba and Saskatchewan. As such he was in medical charge of the Sewell Camp in Manitoba, and later was largely instrumental in bringing together and establishing the 10th Field Ambulance. This unit arrived in England on March 13th, 1916, and within a month was at work at the front. Here Colonel Tanner immediately impressed all with whom he came into contact as a most capable officer with administrative abilities of the first order. His death is a very distinct loss to the Canadian Army Medical Service.

Surgeon-General Carleton-Jones, D.M.S. Canadian Expeditionary Force, writes: "Lieutenant-Colonel Tanner I have only known a short time, since he joined the Expeditionary Force in England, but from what I saw of his work in England and in France, I was particularly struck with his natural ability for military medical work. I feel his loss very much, as it means that the service is deprived of a most capable and useful officer."

*Wounded.*

Captain D. A. R. Haddon, R.A.M.C.(T.F.).
Captain J. J. Jamieson, Canadian A.M.C.
Captain J. A. Reid, Canadian A.M.C.
Captain C. F. White, R.A.M.C.
Lieutenant E. V. Sullivan, R.A.M.C.

*Missing.*

Captain F. S. Park, Canadian A.M.C.
Captain W. R. W. Haight, Canadian A.M.C.

*Died on Service.*

Temporary Lieutenant G. S. Engineer, I.M.S., was reported as having died on service, in the casualty list published on June 8th. His commission was dated July 24th, 1915.

Temporary Captain Elfred Chalmers Austin, R.A.M.C., died at West Didsbury, Manchester, of septicaemia following pneumonia and empyema, on June 5th, aged 39. He was educated at St. Mary's Hospital, and took the diplomas of M.R.C.S. and L.R.C.P.Lond. in 1899, subsequently taking the F.R.C.S. at Edinburgh in 1903. After acting as resident obstetric officer at St. Mary's Hospital, house-physician to the Leicester Infirmary and Fever House, and assistant medical superintendent of the Kensington Union Infirmary, he went into practice at Barnard Castle. About four years ago he was appointed medical superintendent of the Hope Hospital, Salford. In March, 1915, he was appointed by the Manchester Guardians medical superintendent of the Withington Institution Hospital and of the Dr. Rhodes Memorial Home, Withington. The Withingtcn Hospital was soon after transferred to the military authorities as a hospital for sick and wounded soldiers, and he received a temporary honorary commission as captain in the R.A.M.C. while in charge of it. He was a hospital administrator of great experience, keenly interested in surgery, and an operator of repute. He leaves a widow and two young daughters.

### PRISONERS OF WAR.

On June 7th the War Office published a list of the officers taken prisoners by the Turks when General Townshend's force surrendered at Kut-el-Amara in April owing to want of food, after enduring a siege of five months. The total number of names given was exactly 200, and it was stated that a few more would follow. Besides General Townshend himself, there were five other general officers in the force: Major-Generals Sir C. J. Melliss, V.C., K.C.B., and W. S. Delamain, D.S.O., and Brigadier-Generals H. D. Grier, C.B., W. G. Hamilton, C.B., D.S.O., and G. B. Smith, C.B. Among the 200 officers were twelve officers of the R.A.M.C. and twenty of the I.M.S.

*R.A.M.C.*

Lieutenant-Colonels J. Hennessy, C.B., and H. O. B. Browne-Mason.

Majors E. V. Aylen, E. Bennett.

Captains A. S. Cane, C. E. M. Jones, A. T. J. McCreery, R. K. Mallam, L. Murphy, T. E. Osmond, and J. Startin.

Lieutenant F. T. Simpson.

*I.M.S.*

Colonel P. Hehir, C.B., Principal Medical Officer.

Majors S. Anderson, C. H. Barber, W. M. Pearson.

Captains L. A. P. Anderson, D. Arthur, R. C. Clifford, S. C. R. Haughton, H. H. King, J. S. S. Martin, K. K. Mukerji, C. Newcomb, M. L. Puri, and F. H. Salisbury.

Captain G. O. Weston, I.S.M.D.

Lieutenants N. K. Bal, R. V. Martin, and W. C. Spackman.

Temporary Lieutenants A. Y. Dabholkar and N. R. R. Ubhaya.

DEATHS AMONG SONS OF MEDICAL MEN.

Austen, Mark, Midshipman H.M.S. *Queen Mary*, only son of Fleet Surgeon Austen, R.N., killed in action, May 31st, aged 16.

Bates, Edwin Raymond, Midshipman H.M.S. *Indefatigable*, elder son of Dr. Bates, of Lingfield Road, Wimbledon, killed in action on May 31st, aged 17. He entered Osborne in January, 1912.

Cathcart, F. J., Lieutenant R.F.A., aged 21, who was killed in action in Mesopotamia on June 4th, was the only son of Mr. C. W. Cathcart, Senior Surgeon to the Edinburgh Royal Infirmary. He was an engineering student at the University of Edinburgh, where he was a member of the artillery unit of the O.T.C. His commission was dated August 26th, 1914. Before going to Mesopotamia he had seen service at Suvla Bay.

Cooper, William Francis Reginald Ashley, Midshipman H.M.S. *Indefatigable*, only son of the late Dr. T. G. Duncan Cooper, killed in action on May 31st, aged 18.

Faulkner, Robert Irvine, Lieutenant H.M.S. *Black Prince*, younger son of Dr. C. I. Faulkner, late of Escrick, Yorkshire, killed in action on May 31st. He joined the navy as a midshipman in May, 1904, and became lieutenant in July, 1908.

Flemming, Thomas Frederick Stewart, Lieutenant H.M.S. *Invincible*, aged 22, killed in action on May 31st, was the eldest son of Dr. Charles Flemming of Bradford-on-Avon.

Hind, Charles Raymond, Second Lieutenant South Staffordshire Regiment, second son of Alfred E. Hind, F.R.C.S., of Portland House, Jersey, killed in action on May 30th, aged 22. He was educated at Laleham School and at Radley College, where he was captain of the eleven, and had been a medical student at Pembroke College, Cambridge, for two years, when the war began. He got a commission from October 3rd, 1914, and for a year had commanded a brigade grenade company in France, having been mentioned in dispatches.

Hodgson, Edward Thomas, Midshipman H.M.S. *Invincible*, younger son of Dr. Hodgson, of Alresford, Hants, killed in action on May 31st, aged 17. He was a second term cadet at Dartmouth when the war began, and he went to sea. He had been present in the battles of Heligoland Bight and of the Falkland Islands.

Lydall, Rev. Cyril Wykeham, M.A., Chaplain H.M.S. *Lion*, son of the late Wykeham Hawthorn Lydall, M.D.Lond., killed in action on May 31st by a shell which struck H.M.S. *Lion* in the recent action. He was born in 1873, and was educated at Bradfield and Worcester College, Oxford. He had held previous commissions as chaplain in the *Minerva* and the *Swiftsure*. He was to have been married on the Monday following the action to Miss Grace Clarke, of Newcastle House, Nottingham. He was a nephew of Lord French.

Matthews, Humphrey, Lieutenant Royal Navy, lost in H.M.S. *Hampshire* on June 5th, aged 28, son of Valentine Matthews, Colonel late R.A.M.C.(Vol.).

O'Brien, Hugh Rivers Hamilton, Captain Royal Field Artillery, only son of Lieutenant-Colonel J. O'Brien, I.M.S. (retired), of Newstead, Instow, North Devon, killed in action on June 1st, aged 25. He was born in August, 1890, got his first commission in December, 1910, and became lieutenant on December 23rd, 1913.

MEDICAL STUDENT.

Surgeon-Probationer Robert Walker (H.M.S. *Shark*) was an Australian. He was in his fourth year as a student in medicine at the University of Edinburgh. He had won the Vans Dunlop scholarship in anatomy, the John Aitken Carlyle and the Mackenzie bursaries in anatomy, as well as the Cunningham memorial medal presented to the most brilliant student of the year in anatomy. He had in addition won eight medals in other subjects at the university.

## NOTES.

FRENCH AND RUSSIAN PRISONERS IN GERMAN CAMPS.

A NEW arrangement which came into force on June 6th will henceforth ensure a regular distribution of 2 kilos of bread a week to all French prisoners in Germany. The bread ration provided by the German Government is 300 grams a day. The consignments of foodstuffs and clothing will continue as heretofore. All the French departmental organizations for aid to prisoners have been invited to group themselves into a national federation, and this organization, which has its head quarters in Paris, has undertaken to manage the bread supply. In this it will be helped by the French Government and by the International Red Cross Bureau in Geneva. The Federation has obtained certain guarantees. In each camp a delegate may correspond directly and without control with the Federation to inform it as to the regularity of delivery. A further control will be exercised by the neutral embassies. The German Government has authorized the transport of collective consignments by express. It has also undertaken henceforth to furnish the exact numbers of French prisoners in each camp.

There are many complaints in the French papers about the ill-treatment of French prisoners in German camps It is said that the sick are forced to work before they are well. *Le Journal* of June 5th published the statement of a soldier repatriated from Gardelegen on account of cancer, which he attributes to a blow in the stomach with the butt end of a rifle when he was suffering from a wound. At Erfurt, a month and a half before the repatriation, ten severely wounded men were left behind in huts lying on mattresses without any care; two of them suffering from tuberculosis died. Every pretext is seized upon for torturing the men and inflicting on them fresh sufferings and privations. A letter from a prisoner to his father is quoted in which the writer says that he and his fellow captives have to work from 7 a.m. till mid-day and from 1 to 6 p.m. on starvation diet. He adds: "Frankly, they try to kill us." To mislead public opinion the Germans continue to send out lying reports as to the treatment of the prisoners in France. The reports of neutral delegates as to the dépôts in Brittany which they have recently visited testify to the excellent impression made upon them. At Chateauneuf, where officers are interned, the delegate reports that "the state of the camp and of the prisoners is excellent." As to the Russians, there is abundant evidence of the bad treatment to which they were subjected by their German gaolers. The latest is given by the Amsterdam *Telegraaf*, which is quoted in the *Times* of June 10th as saying that some Russian soldiers who had arrived in Holland from German prison camps stated that during the sixteen months they were in captivity they did not taste meat. Their food consisted of potato soup and 7 oz. of bread daily. One of them said that nevertheless their treatment of the matter of food was much better than that of the British prisoners, many of whom fell ill.

MEDICAL OFFICERS WANTED.

*The Scottish Women's Hospitals for Foreign Service.*

Applications are invited from medical women for the posts of radiographers and bacteriologists in the Scottish Women's Hospitals. An honorarium at the rate of £200 per annum is granted, and uniform, board, and travelling expenses are provided. Application should be made to the Honorary Secretary, Personnel Committee, Scottish Women's Hospitals, 2, St. Andrew Square, Edinburgh.

# England and Wales.

WAR-TIME SANITATION.

A CONFERENCE held at the house of the Royal Sanitary Institute of London last week was attended by a large number of medical officers of health and other delegates from nearly one hundred local authorities to discuss sanitary administration under war conditions. It was opened by the Lord Mayor of London, who was followed in the chair by the Mayor of Westminster; on the second day the meeting was presided over by Mr. Leslie Scott, K.C., M.P.

*Economies in Health Departments.*

At the first meeting, on June 9th, a discussion on the maintenance of the standard of municipal sanitation during the continuance of war conditions was introduced by Mr. H. Percy Boulnois, M.Inst.C.E., and Dr. James Wheatley, Medical Officer to the Shropshire County Council. Dr. Wheatley considered that child welfare and the medical inspection of school children should be maintained in all essentials. In other respects economies might be effected in health departments; work of the nature of original investigation might be dropped, and a certain amount of inspection eased off. He urged that action, with regard to conditions injurious to health, should be of a more summary and preventive character than at present; the creation of a nuisance, and not persistence in it after warning, should be the offence. Generally speaking, the measures for the prevention of infectious diseases should not be relaxed, and in some directions should be strengthened. Bacterial examinations necessary for the diagnosis of such diseases should at all costs be maintained. As to tuberculosis, it would be well to concentrate upon preventing the spread of the infection, and the M.O.H. should have power to cause the removal to hospital of any patient who was a grave danger to his household and to the public. Dr. Wheatley's further suggestion that, in the absence of other accommodation, boards of guardians should be compelled to provide for advanced and dangerously infective cases of phthisis by means of temporary shelters in connexion with the workhouses, was criticized by one or two subsequent speakers.

Much of the discussion centred around the question of disposing of house refuse. Mr. Boulnois, in his opening paper, expressed the opinion that though it would be false economy to interfere with the regularity of the refuse collection, the householder might do more in the way of burning refuse, and separating refuse which had an economic value. Dr. J. T. C. Nash (Norwich) suggested that three receptacles should be provided—one for green-stuff, a second for bottles and pots, and a third for other waste materials—and Dr. H. Kerr (Newcastle) held that a local by-law might be framed making it incumbent upon the householder to burn his own refuse. In reply to the objection that in many houses now there were only gas fires, Mr. Boulnois suggested that a simple domestic cremator might be designed, to be attached either to a gas or coal kitchen range. Major A. J. Martin urged that there would be no hardship in making the civilian do with regard to his refuse what the soldier had to do in the camp, and suggested that men ineligible for military service should be compulsorily put to scavenging or other public duty. Lieutenant-Colonel Herbert Jones (Hereford), speaking as one who had recently exchanged civil for military service, said that nothing struck him more in the transition than the rapidity with which reforms were accomplished in camp, as compared with the long delays in civil work. A resolution was passed unanimously requesting the Council of the Institute to consider at the earliest moment what temporary extension of legal powers was necessary to economize labour in the public health service and to make it more efficient.

*The Administration of the Mental Deficiency Act.*

At the meeting on June 10th Dr. A. Brown Ritchie, the medical officer of the Manchester Education Committee, opened a discussion on the administration of the Mental Deficiency Act. In dealing with the rule that all children certified as mentally defective should be kept in the special schools until 16, he said that a considerable number of them were as far advanced at 14 as they would be at 16, and there was no reason for keeping them at school until 16 unless some special training was provided during the last two years. He considered that the teacher's evidence was of great assistance in framing a diagnosis of mental deficiency or backwardness, but did not sympathize with the agitation that the teacher should take a higher position than that of a witness before the medical assessor. While he had always taken advantage of the information given by teachers, he could not see the value of a joint certificate in which the teacher and doctor shared the responsibility. Some one authority must certify the mentally defective. Mr. Leslie Scott, M.P., thought that the true policy would be to educate in the special schools those children who were likely to become more or less self-supporting citizens in after-life. Dr. Veitch Clark (Croydon) referred to the great difficulty of defining educability and non-educability, and preferred a triple classification—educable, trainable, and non-trainable. He did not think it was possible to look for any solid advance by means of home supervision, and in the country just now private guardianship of mentally defective children was practically non-existent. Dr. G. E. Shuttleworth (London) urged that there should be "backward" schools or classes in which children who were not decidedly but only presumably defective could be kept under observation before being certified. Dr. J. Oldershaw (Wallasey) said that the non-educable class of children ought to be handed over by the education authority to the mental deficiency committee, and suggested that the Government would do well to form a kind of non-criminal Borstal institution. Another speaker stated that at Brighton, under the Guardianship Society, defectives had been placed out with respectable families, and were visited once a fortnight, and by the doctor once a quarter, employment being found for them as far as possible.

BY-LAWS FOR MASSAGE ESTABLISHMENTS IN LONDON.

At the meeting of the London County Council on June 6th the by-laws which have been framed for massage establishments, as provided by the London County Council (General Powers) Act, 1915, were submitted and approved. These by-laws, which are framed for the purpose of preventing immorality, lay down a very strict system of registration and supervision, and, with regard to records, it is made necessary for each registered person to show on demand all details with regard to his assistants and fees, as well as full particulars of every case of remedial treatment, with the name and address of the medical practitioner (if any) by whom or at whose instance such treatment was prescribed, the name of the person giving such treatment, and the sex of each patient. The definition of a massage establishment is a place used "for the reception or treatment of persons requiring massage, manicure, chiropody; light, electric, vapour, or other baths or similar treatment," but hairdressing establishments, where massage is confined within certain limits, have partial exemption. The chairman of the Public Control Committee stated that up to the present the Act had proved very successful, and the proportion of places suspected of being objectionable was very small.

# Scotland.

WOMEN MEDICAL STUDENTS AT EDINBURGH AND GLASGOW.

THE necessity for providing further accommodation for the largely increased numbers of women studying medicine both in Edinburgh and Glasgow is engaging the attention of the medical teachers in the two cities. At the meeting of the Glasgow University Court, on June 8th, Principal Sir Donald MacAlister stated that he had to ask authority to make some additions to the equipment of Queen Margaret College, especially for students of medicine; congestion was already evident in the departments of anatomy and chemistry. He was unable to state what the cost would be, but as the number of women students had doubled during the year it was necessary to face the situation. The extension proposed would take the form of internal arrangements. The request was granted. In Edinburgh matters are somewhat different and it is possible that more radical changes may be required. Some three years ago (see BRITISH MEDICAL JOURNAL, October 25th, 1913, p. 1109) new anatomy rooms were provided for the Edinburgh School of Medicine for Women, the institution whose lecturers are recognized by the University as the teachers of the women students in Edinburgh. It was then thought that sufficient accommodation had been provided for many years. The phenomenal increases of the past two years have thrown all such anticipations out of gear, and the lecturers of the School of Medicine for Women are approaching the University Court with a view to a conference at which the whole question of the relations existing between the University and the women training for graduation in the School of Medicine could be considered.

FRENCH PROFESSORS IN EDINBURGH.

The French professors who have been visiting universities in Great Britain during the last few weeks were received in the Senate Hall of the University of Edinburgh on June 8th by the Senatus Academicus.

Sir Thomas R. Fraser, as senior professor, presided, and expressed the gratification of the Senate in receiving visitors who represented so many of the higher educational and academic institutions of France, not of Paris only, but of Lyons, Grenoble, Clermont, Montpellier, Nancy, and Poitiers. The visit, he said, recalled the close relations of friendship and co-operation that had existed between France and Scotland for many centuries. The desire that that relation should be maintained had been shown by the formation of the Franco-Scottish Society. There had, however, been no formal or official visit of French professors to Edinburgh since April, 1884, when the university celebrated the tercentenary of its foundation, and received through their numerous representatives the congratulations of practically every civilized nation and educational institution in the world. The university regretted that the distorted arrogance of some of these nations, and even of their most educated classes, had disappointed the full expectations of friendship then originated. This made it all the more a cause for rejoicing that the bond of union between many of these nations, including France, had been unbroken, and, indeed, drawn closer by the

momentous events of the recent past. Sir Thomas Fraser went on to sketch the development of the university since 1884. The number of professors had increased from forty-six to fifty-nine, and of lecturers from three to ninety-four. Practical instruction in research was then scarcely recognized as a part of higher education; now the greater part of the much-enlarged accommodation of the university was occupied by well equipped laboratories. Unfortunately, however, the full life and activities of the university could not at present be exhibited, for the requirements of the devastating war in which, with its gallant allies, the country was engaged against a ruthless and unchivalrous enemy—the patriotism of its alumni and teachers—had depleted the number so much that while the matriculated students in 1913-14 numbered 3,283, in the present session the number was only 1,797. This number would be further reduced in the next session, as all eligible students would be required to give their services to the State, except those in the fourth and fifth years in the Faculty of Medicine. Before the passing of the Military Service Act 4,500 graduates and students had joined the services, or 1,217 more than the total number of matriculated students, both men and women, in the session 1913-14. Of these, at least 170 had been killed in action or otherwise in war service, 126 had been wounded, 2 were missing, and 8 were prisoners. They had acquitted themselves well, as military honours and decorations had been conferred on upwards of 77, while other 90 had been mentioned in dispatches. Other two members of the university had met with an untimely end in the deplorable catastrophe that overtook H.M.S. *Hampshire*—namely, Lord Kitchener and Sir Hay Donaldson, a member of his staff. Lord Kitchener's death added to the sorrow and academic gloom still remaining after the death of their late greatly distinguished Principal, Sir William Turner. They had now to lament the loss of their Lord Rector. These bereavements, as their guests would understand, had led to some curtailment in the expression of their hospitality, but, he was sure, not in the warmth and cordiality of their welcome. After dwelling on the unalterable determination of the empire and its allies to continue the task imposed on them of curbing the arrogant assumptions of their inhuman Germanic enemy, Sir Thomas Fraser went on to refer to the war of commercial and manufacturing industry which would follow the other war, and upon which the fate of nations would largely depend. Our educational system and methods, he said, would have to be remodelled to increase the facilities for advanced instruction throughout a wider range of the community than was now reached. A lesson which the war had taught was that expansion was required not only in general education, but especially in science and technology, in finance and commerce and modern languages, in the physical training of the body, and perhaps also in mental and moral discipline.

Dr. Joubin, Rector of the Lyons Academy, who responded, said that France also was mourning Lord Kitchener. He and his colleagues, he said, had been touched by the cordial welcome they had everywhere received; they had visited both old and new universities, and had been greatly impressed by everything they had seen. The empty classrooms had their counterpart in France, where everyone had gone to the war. He concluded by referring to the close and old union between Scotland and France, and expressed the hope that the exchange of students which had continued since the Middle Ages would go on after the end of the war, for the two countries had much to learn from each other.

In the evening the visitors were the guests of the Scottish branch of the Franco-Scottish Society at an "At home" in the Kintore Rooms, where they were received by Lord Strathclyde, president of the branch.

Glasgow was visited on June 8th and 9th, and Principal Sir Donald MacAlister, K.C.B., addressed the French professors, who were shown over the University, Queen Margaret College, and other places of interest.

### Red Cross Ambulance Train.

There was a large attendance of Red Cross bearers at a drill held at the Aberdeen Joint Station on June 11th. Mr. Bennett Mitchell, Red Cross transport officer, said that on June 10th the Red Cross had the first ambulance train to deal with without any aid from the R.A.M.C. They had the maximum of cot cases, and the number of miles run amounted to 244. The time occupied was sixty-five minutes. Sir Alexander Ogston, who has enrolled himself as a volunteer, said it was necessary to be ready to deal with 470,000 wounded and sick at the lowest computation on the side of the Allies within the next twelve months. The work done at the train was such as those engaged in it might be proud of; but even if the 470,000 were dealt with by this one train at the same rate without a halt, day or night, it would take seven months to clear the whole into the hospitals.

## Ireland.

### Infant and Maternal Welfare.

A couple of months ago we gave some account of an inquiry instituted by the Carnegie United Kingdom Trust into the present position with regard to infant and maternal welfare, with special reference to the provision made, or in immediate contemplation, in various areas. As was there indicated, the inquiry instituted by the Executive Committee is of a comprehensive character, the desire being to obtain the fullest information, as to the existing provision, as to the legislation which exists for governing the administration of such centres, and as to the extent to which the municipal authorities have availed themselves of the powers they possess. After obtaining such full information the Executive Committee will consider what steps, if any, the trustees of the Carnegie Fund can take to assist in the solution of the problems which arise, the intention of the trustees being that their efforts shall not supersede, even in a small measure, State or municipal endeavour. It was recognized, however, that there may be some directions in which financial assistance may prove useful in encouraging developments which might not otherwise be attempted. As was stated when the matter was first noticed in these columns, Dr. E. W. Hope, M.O.H. for Liverpool, is supervising the inquiry for England and Wales. Dr. Leslie Mackenzie is discharging the same office for Scotland, and the trustees have secured the assistance of Dr. E. Coey Bigger, of the Local Government Board in Ireland, for the preparation of the report for Ireland.

The Local Government Board in Ireland has addressed a circular letter to the clerks of county boroughs and urban districts drawing attention to the operation of the Notification of Births (Extension) Act, 1915, which contains provisions enabling local authorities to make arrangements for attending to the health of expectant mothers, and nursing mothers, and of children under 5 years of age. In view of the considerable incidence of infant mortality in urban districts in Ireland, the problem of protecting infant life is one which deserves the serious attention of local authorities, and the fact that a grant of £5,000 in aid of approved schemes for maternity and child welfare has been included in the estimates to be submitted to Parliament will no doubt serve as an additional inducement to take action. Any scheme should, in the Board's opinion, include not only the care and supervision of children in the first year of life, and up to the age of 5 years, but should aim at securing improved antenatal and natal conditions.

*Home Visiting.*—The work of home visitation is one to which the Board attaches very great importance, and the first step should be the appointment of an adequate staff of qualified health visitors.

*Maternity Centres.*—In the case of the larger urban areas, it would be desirable to provide maternity centres to which expectant mothers and mothers with infants and young children could be referred for advice and treatment. Such centres should be under the charge of a medical officer and qualified nurse; and careful records kept for which the medical officer should be responsible.

*Midwifery Facilities.*—The scheme should further include suitable provision for medical and midwifery attendance for necessitous women not entitled to benefit under the National Insurance Acts or in receipt of assistance from the Poor Law authority.

*Day Nurseries.*—For the care of the young children of working women necessarily absent at work, day nurseries might, in industrial districts, be established. Definite fees should be charged to the mothers, sufficient at any rate to cover the cost of all food supplied.

The Board considers that as far as possible each sanitary

the kind, and he resolved to try his fortune in London. He worked in the dispensary of a medical practice, and spent his spare hours as a student at Charing Cross Hospital. From that time forward progress was steady, and progress ended in success. He was one of a distinguished group of Charing Cross men of the Eighties, winning the respect of his teachers, who quickly appreciated his bright young spirit, ability and industry; and at the same time those of his fellow students who were most intimate with him knew of his humble room in the depths of Bloomsbury, and of his labours in practical pharmacy in the long evenings after his hard day's work in the dissecting room and laboratories. Even before he qualified he was appointed assistant in several of the classes; and, when he had "passed" the Colleges, the post of house-physician under Dr. Henry Green and Dr. Mitchell Bruce, and in due course that of medical registrar and teacher of practical medicine fell naturally to him, as well as a more responsible position in the school. Presently he found himself engaged in the drudgery of serial medical literature and medical coaching, and thereupon he left his nest in Bloomsbury and the dispensing table for the district of Cavendish Square and a practice of his own. In the most determined fashion he did not rest until he had again and again gone to Dublin and returned a graduate with Honours of the Royal University of Ireland. Naturally, he had help from his old teachers, who knew the great value of the assistance which he gave them in return. Still, it was Harold's own character and qualifications that accounted for the position which he reached as one of the most successful family practitioners in London. There was his bright Irish manner and "ways," attracting and securing the respect and intimate regard of patients. The friends who knew him best were aware how much of his success came from his unselfish devotion to poor patients; his bread cast on the waters returned to him after many days. But, quite beyond these, his reputation and position were made by real ability, by knowledge of medicine properly gained, and by the thoroughness of his work. With all his popularity, he never became dependent on social or fashionable repute, but remained a student, ready to appreciate and employ with well-trained discrimination every increase of knowledge and every improvement in the means of diagnosis and treatment. If a complaint were ever heard from his patients it was that he was over-exacting. He always used the best. He spared no expense in respect of laboratory reports, radiographic investigations, nurses, consultations and operations. He would leave nothing undone that he considered right and possible. And so obedience to advice, strictly enforced, developed into confidence and loyalty, and then into personal regard and close attachment.

The last sixteen years of his life were a specially happy period because of his appointment as Physician to the Hospital of St. John and St. Elizabeth and member of the council. By none will his death be more deplored than by the Sisters of Mercy and his colleagues there. He was also referee to the London Cremation Company and Honorary Physician to the Academy of Dramatic Art.

It is two years since Dr. Harold's oldest friends who watched his career with cordial interest began to note in him evidences of physical and nervous strain. With difficulty he was persuaded to rearrange and reduce his work. Then fell on him the cruel hand of the great war. His eldest son left Oxford for the front. His second son, a naval cadet of 15 only, was lost with H.M.S. *Hogue* on September 22nd, 1914. He was never himself again. He leaves a widow and two sons and two daughters.

J. M. B.

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SAMUEL F. McLACHLAN, M.B., C.M.GLASG., J.P.

THE death took place on June 9th of Dr. McLachlan of Longtown, one of the oldest and best known medical men in North Cumberland. Dr. McLachlan was a Dumfriesshire man, was educated at the University of Glasgow, and graduated M.B., C.M. in 1873. He settled in Longtown in 1879, and continued in practice there until failing health compelled him to retire in 1914. He held the post of M.O.H. for the Longtown district for over thirty years, and was keenly interested in sanitary improvements. He was also medical officer of the union, certifying factory surgeon, medical officer to the P.O. He was a member of the British Medical Association up to the time of his retirement. In the midst of the exacting demands of a large general practice he found time to keep himself abreast of the progress of medical science, and was a keen student of the best modern literature. He was essentially a cultured man, and took an active interest in the Longtown Literary and Scientific Society. He was a member of the United Free Church, chairman of the managers, session clerk, and trustee of the church. He was placed on the commission of the peace for the county of Cumberland in 1907, and regularly attended the sittings of the Longtown Petty Sessional Division. The large attendance at the funeral at Arthurat on June 12th from all parts of the district testified to the high esteem in which he was held. He leaves a widow and one son.

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LAST month there was laid to rest the remains of one of those quiet unobtrusive practitioners to whom the rural districts of Scotland owe so much, and whose name and fame are household words in the countryside. For thirty-six years, with the exception of a year or two practising in Birmingham, Dr. JAMES GILROY, of Waterbeck, Dumfriesshire, who graduated M.B., C.M.Glasg. in 1889, was the devoted parish doctor of Middlebie. An earnest student and an accomplished clinician, he early acquired the confidence of his patients, and his advice and help were much sought for in neighbouring parishes. He had high literary attainments, and was an occasional contributor to the columns of the JOURNAL. As a friend he was staunch and true. He was a widower, his wife and only child having died many years ago. Professor Gilroy of Aberdeen University, assisted by the local clergy, officiated at the

funeral, which took place amidst manifestations of the utmost sorrow and respect, and was attended by neighbouring fellow practitioners and representatives of all classes in the district. His place will be hard to fill, and when one thinks of the mossgrown gravestones in the quiet burial place of Carruthers, on the banks of the purling Kirtle Burn, it is with the thought that at last he has attained well earned rest and peace—the rest of the faithful and true, and the peace which passeth understanding.

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DR. LÉON GAUTIER, who died on April 20th, was born at Geneva in 1853, and received his preliminary education at the gymnasium and academy of his native city. In 1872 he went to Paris to study medicine, and in 1877 won the post of *interne*, and worked under Hayem, Lancereaux, and Guyot. It was under the inspiration of Lancereaux that in 1882 he presented a graduation thesis on chronic absinthism, a subject as to which little was then known. On his return to Geneva he devoted himself chiefly to obstetrics. He was for a long time librarian and twice president of the Medical Society of Geneva. In 1902 he was elected a member of the Swiss Medical Commission, of which he was later vice-president. Although he qualified as *privat-docent* in the University of Geneva in 1899 he seems never to have delivered any lectures, but he made many contributions to clinical medicine, and especially to obstetrics. His most important literary productions, however, were in the domain of history. His chief work, *La Médecine à Genève jusqu'à la fin du xviii siècle*, is based on researches in the archives of the city extending over twenty years. He also took a considerable part in the compilation of the history of Geneva by the Secretary of State, J. A. Gautier, and in that of the registers of the council of the city. Among his other writings are memoirs on the last epidemic of plague in Geneva, on the lepers in Geneva in the Middle Ages, on the diseases of Calvin, and reports on legislative subjects connected with medicine—the federal insurance laws, the federalization of midwives, the reform of medical studies, and alcoholism. Gautier took a very active part in the campaign against tuberculosis. In 1909 he was elected a member of the Grand Council of Switzerland, where he was often the only representative of the medical profession; he was a strenuous defender of its rights, and was always active in the promotion of measures of sanitary betterment. On the outbreak of the war he joined the International Prisoners Agency at Geneva, and did much valuable work for it.

## OUR BELGIAN COLLEAGUES AT HOME AND ABROAD.

A MEETING of the Central Committee of the Fund was held on June 8th at the office of the *Lancet*, when Sir Rickman Godlee, the chairman of the Committee, reported the receipt, through the International Commission for Relief in Belgium and Mr. Herbert Hoover, of an acknowledgement of a cheque for £800 sent by the Committee for distribution to medical men and pharmacists in Belgium. The distribution had been made through the agency of the Aide et Protection aux Médecins et Pharmaciens Belges Sinistrés. This sum was the first of three monthly donations of £800 which it had been agreed by the Committee should be transmitted to Belgium in the manner and for the purpose described. Mr. Hoover enclosed also for the consideration of the Committee a transcript of the proceedings of the Belgian Committee, which sufficiently showed the urgent need of the money sent and the wise way in which it was allocated. The Committee thereupon decided to continue sending these monthly grants for three more months. Professor H. G. Greenish was elected a member of the Committee, and will co-operate with Dr. Des Voeux in organizing the consideration of individual cases of distress of Belgian pharmacists in this country. The total receipts of the Fund up to June 8th were £19,250.

SUBSCRIPTIONS.

The subscriptions to the Belgian Doctors' and Pharmacists' Relief Fund received since the last list was published are as follows:

| | £ | s. | d. |
|---|---|---|---|
| Dr. G. H. D. Carpenter (thirteenth and fourteenth donations—total £14) ... ... ... | 2 | 0 | 0 |
| Mrs. Victor Williams ... | 2 | 2 | 0 |
| South-West London Pharmacists' Association, collected by Mr. J. Krall ... ... ... | 25 | 0 | 0 |

Subscriptions to the Fund should be sent to the Treasurer of the Fund, Dr. H. A. Des Voeux, at 14, Buckingham Gate, London, S.W., and should be made payable to the Belgian Doctors' and Pharmacists' Relief Fund, crossed Lloyds Bank, Limited.

# Universities and Colleges.

## ROYAL COLLEGE OF SURGEONS OF ENGLAND.

AN ordinary Council was held on June 8th, 1916, Sir W. Watson Cheyne, President, in the chair.

*Court of Examiners.*

Mr. R. L. Knaggs and Mr. Jonathan Hutchinson were re-elected on the Court.

*Results of Examinations.*

*First Fellowship.*—Eleven candidates were approved at the late examination.

*Final Fellowship.*—Diplomas were granted to the following candidates found qualified at the recent examination:

A. L. P. Gould, Temporary Surgeon R. S. Lawson, C. W. B. Littlejohn, F. D. Saner, G. S. Miller.

*Dental Surgery.*

Diplomas of the Licence in Dental Surgery were granted to eighteen candidates found qualified.

*Examiners in Anatomy and Physiology for the Fellowship.*

The following were appointed for the ensuing year:

ANATOMY.—W. H. Clayton Greene, R. W. Reid, Gordon Taylor, W. Wright.

PHYSIOLOGY.—G. A. Buckmaster, J. Sydney Edkins, J. B. Leathes, A. Rendle Short.

*Examiners under the Conjoint Examining Board.*

*Examiners in Elementary Biology.*

ELEMENTARY BIOLOGY.—G. P. Mudge, W. G. Ridewood.

ANATOMY.—J. E. S. Fraser, A. M. Paterson, A. Thomson.

PHYSIOLOGY.—C. M. H. Howell, H. E. Roaf, G. A. Buckmaster (subs.).

MIDWIFERY.—H. R. Andrews, J. S. Fairbairn, C. H. Roberts, G. D. Robinson.

PUBLIC HEALTH.—*Part I:* J. W. H. Eyre. *Part II:* Sir Shirley Murphy

TROPICAL MEDICINE.—J. W. H. Eyre, C. W. Daniels.

*Candidates for Election on the Council.*

A meeting of the Fellows will be held at the College on Thursday, July 6th, for the election of four Fellows in the vacancies occasioned by the retirement in rotation of Sir Alfred Pearce Gould, Mr. W. F. Haslam, and Sir William Arbuthnot Lane, and by the death of Mr. Stanley Boyd.

*Candidates.*

Of the three retiring candidates—Sir A. Pearce Gould, Sir Arbuthnot Lane, and Mr. Haslam of Birmingham—the third alone seeks re-election. Six Fellows not already on the Council are candidates—namely, Mr. T. H. Openshaw, C.M.G., a Member in 1882, a Fellow December, 1886 (London Hospital); Mr. Raymond Johnson, Member 1885, Fellow December, 1888 (University College Hospital); Mr. John Murray, Member 1887, Fellow December, 1890 (Middlesex Hospital); Mr. Vincent Warren Low, Member 1891, Fellow December, 1893 (St. Mary's Hospital); Mr. Herbert Pendlebury, Member 1896, Fellow December, 1897 (St. George's Hospital); and Mr. Francis J. Steward, Member 1895, Fellow 1898 (Guy's Hospital). Thus seven Fellows will contest the four vacancies left by the three retiring members and by the death of Mr. Stanley Boyd.

# Medical News.

THE Queen has become patroness of the Incorporated Society of Trained Masseuses. The society has been in existence for twenty years, and since the outbreak of war its members have done much work among the wounded.

AT a special meeting of the Section of Surgery of the Royal Society of Medicine to be held on July 12th at 5 p.m., Dr. Fred. H. Albee of New York will give a cinematograph demonstration on bone surgery, including bone grafts for Pott's disease, inlay grafts for fracture of long bones, and peg grafts for fracture of the neck of the femur.

MR. J. Y. W. MACALISTER, Secretary of the Royal Society of Medicine, desires to replace in the library of the Society the copy of Henry Lawrence's *Treatise on Hernia*, 1807, which has been destroyed by mice. He has tried the booksellers in vain, and would be grateful to any one who would put him in the way of finding a sound copy.

AT the annual general meeting in London of the Coroners' Society of England and Wales, Mr. F. N. Molesworth, solicitor, H.M. Coroner for the Rochdale Division of Manchester, was unanimously elected President for the ensuing year, vice Dr. F. J. Waldo, J.P., H.M. Coroner for the City of London and Ancient Borough and Vill of Southwark. Owing to the war, the usual banquet was not held, but the members of council were entertained at lunch by the outgoing president (Dr. Waldo).

THE Council of the Faculty of Insurance has appointed a committee to consider the report of the departmental committee on approved society finance and administration, and to advise on the whole position of the insurance scheme. Mr. John Hodge, M.P., will act as chairman, and three other members of Parliament have joined—Mr. Handel Booth, Mr. G. W. Currie, and Mr. J. W. Pratt. The committee also contains representatives of approved societies, of the Federation of Employers Provident Funds, and the chairman of the Manchester Insurance Committee. The committee, when complete, will include representatives of women's organizations.

DR. W. C. GORGAS, Surgeon-General of the United States Army, said recently that the United States would, in a few years, have an army of one million men, and would require at least 10,000 medical officers. He recommended the formation of a national conference of medical examiners, who should prepare questions to be set by State boards throughout the country. Candidates who passed this examination would be eligible for the United States Medical Reserve Corps, and would not be required to pass any other examination for the licence to practise. Each surgeon would be instructed in field duties, camp sanitation, and the foods suitable for different climates.

AT a drawing-room meeting last week in support of the South London Hospital for Women, Clapham Common, Sir Frederick Treves, who was the principal speaker, said that it was impossible to foresee what the full development of the woman doctor might be, or what limitations she might encounter, but it was evident that her first energies were rightfully directed to the treatment of her own sex. If the battle of the woman doctor was over, and the obstacles put in her way were becoming negligible, and the opportunities in front of her were increasing year by year, it was none the less true that she could not be said to have come into her own until hospital practice was more fully open to her. In hospital practice he (and now she) had the continual stimulus and safeguard of well-informed criticism. The other speakers were Lady Frances Balfour and Mr. Pett Ridge.

THE accounts presented at the usual monthly meeting of the Medical Sickness and Accident Society on May 19th showed a falling off in sickness in comparison with the same period last year, and the experience is below the expectation for the four months—an unusual feature for the spring months. It was reported that further sums had been invested in Exchequer bonds, making a total of £180,000 now invested in war stocks since August, 1914. Applications were reported from members for annuities under the new table which is now registered by the department, and is accordingly open both to members and non-members, and it is hoped will prove satisfactory and useful to the profession generally. The committee has decided that in future the society will pay the usual fee of £1 1s. for the medical examination of both new and additional proposals, the member to have the same right as hitherto of going to whom he pleases for such examination unless otherwise instructed by the society. Membership is still open to those taking temporary commissions in the R.A.M.C. or the Royal Naval Medical Service within certain limits with regard to amounts, as so far the committee do not consider that the casualties justify them in any way altering their previous decision in this matter. No extra premiums are charged to members of the two forces mentioned. All applications for prospectuses and further information should be addressed to the Secretary, Medical Sickness and Accident Society, 300, High Holborn, W.C.

# Letters, Notes, and Answers.

THE telegraphic addresses of the BRITISH MEDICAL ASSOCIATION and JOURNAL are: (1) EDITOR of the BRITISH MEDICAL JOURNAL, *Attiology, Westrand, London;* telephone, 2631, Gerrard. (2) FINANCIAL SECRETARY AND BUSINESS MANAGER (advertisements, etc.), *Articulate, Westrand, London;* telephone, 2630, Gerrard. (3) MEDICAL SECRETARY, *Medisecra, Westrand, London;* telephone, 2634, Gerrard. The address of the Irish office of the British Medical Association is 16, South Frederick Street, Dublin.

☞ *Queries, answers, and communications relating to subjects to which special departments of the* BRITISH MEDICAL JOURNAL *are devoted will be found under their respective headings.*

## QUERIES.

### ACNE ROSACEA.

S. asks for suggestions as to the treatment of an obstinate case in a healthy working woman, aged 34, an abstainer from alcohol and, recently, from tea. The nose is much disfigured and the rash has extended down to the chin.

## ANSWERS.

### ATTENDANCE ON SOLDIERS BY CIVIL MEDICAL PRACTITIONERS.

THE note by "X. Y. Z." published last week, has brought us a number of other letters. Two correspondents state that their experience has been exactly the same—namely, that they have received no reply to applications made in proper form—and a third states that he has received no reply to a letter of inquiry. On the other hand, a correspondent states that though he has had to wait periods varying from one to four months after sending in his accounts, he has always been paid, though he has sometimes had to send a reminder. Another correspondent states that he has in the course of twelve months sent thirteen accounts for medical attendance to soldiers on furlough for varying sums, and that they have all been paid with satisfactory promptitude. A Major, R.A.M.C., asks whether "X. Y. Z." studied the regulations of the Royal Pay Warrant before sending his account. He would, this correspondent adds, have no claim on Government unless regularly appointed with the approval of an A.D.M.S. to attend the troops at contract rates.

## LETTERS, NOTES, ETC.

### PARAFFIN FOR LOUSINESS.

A NAVAL medical officer writes to express the opinion that the use of paraffin to get rid of lice in the manner suggested by Dr. B. Hall in the JOURNAL of June 10th, p. 837, might prove decidedly dangerous owing to the inflammability of the paraffin. He thinks that if the method is used at all a special warning should be given, for thoughtlessness or inexperience might lead to disastrous results.

### MEDICINE AND THE NATIONAL VOLUNTEERS.

COLONEL JAMES CANTLIE (Principal, The College of Ambulance, 3, Vere Street, London, W.) writes: In reply to a letter from Dr. Hildige (at p. 840, June 10th, 1916) in regard to ambulance instruction, I beg to say that classes for instruction of medical men have been held from time to time as the necessity arises. Medical men wishing to join should communicate with the secretary.

### INADEQUATE MEDICAL EXAMINATION OF RECRUITS.

A CORRESPONDENT tells us that he has recently had to examine about thirty enlisted men alleged to be medically unfit. Among them were the following: (1) An undersized and badly-developed boy, weighing 98 lb. and measuring 30 in. round the expanded chest. The commanding officer reported that he was quite unable to march, bear his pack, etc. (2) A boy mentally deficient and unable to answer intelligibly even the simplest question. The commanding officer reported that he could not understand any order and walked about in a lost way. (3) Several men with very defective vision, for whom the oculist could do little, and some who were almost stone deaf. Even the most cursory examination, our correspondent states, made it apparent that none of these men would make efficient soldiers. Some of them had been in the army for two or three months and some for a shorter period. The military authorities, with no medical knowledge, had discovered, as quickly as could be expected of them, that these men were physically or mentally deficient. At the same time, the expense to the State must have been considerable. Such a state of things reflects, our correspondent thinks, very badly on the medical profession. He adds that the time spent in examining and discharging such men, who should never have been passed, involves serious waste of the time of medical men whose services are now so urgently needed.

### BOLUS AND BULLET.

THERE is a story, duly put down in his tablets by that interesting diarist, Grant Duff, of an eighteenth century doctor who had been an apothecary and afterwards a physician at Bath. Being obliged to flee the country to escape his creditors he found his way to Berlin. There he contrived to get an audience of Frederick the Great, among whose good qualities was readiness to hold converse with all sorts and conditions of men. After questioning the doctor about his experiences the King said to him with true Teutonic tact, "You must have killed a great many people." "Not so many as your Majesty!" was the prompt reply. Frederick's degenerate descendant is said to be fond of rude jests at doctors, but we do not think that even his hardened conscience would now allow him to expose himself to the same retort.


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